

# **ADDITIONS TO THE FLORA OF MELGHAT**

*(Some rare and uncommon plants)*

*By - Prabha Y. Bhogaonkar*

*&*

*Vinod D. Devarkar.*

**Technical Bulletin No. VII.**

**Published by**

**The Directorate Project Tiger Melghat,  
Amravati. 444602.**



**ADDITIONS  
TO  
THE  
FLORA OF  
MELGHAT**



**ADDITIONS  
TO THE  
FLORA OF MELGHAT**

© Publisher

**Publisher :-**

Conservator of Forests and  
Field Director Project Tiger, Melghat  
Camp, Amravati, Maharashtra, India.  
Postal Code :- 444 602  
Telephone&Fax :- [0721] – 662792  
(Contact Publisher for copies of this Publication.)

**Printed at :-**

*Effect's* Printer & Sales  
1/1 Shastri Nagar, Maltekdi Road,  
Amravati (M.S.) Ph :- 663741

March 1999



सत्यमेव जयते

GOVT. OF MAHARASHTRA

Principal Chief Conservator of Forests,  
M.S., Nagpur

DR. VINOD D. DEVARKAR  
HEAD

Department of Botany  
S.C.S. College, OMERGA  
Dist. Osmanabad 413 606

## FOREWORD

With the advance in Scientific Technology even a Natural resource like Forests can be accurately assessed through the Satellite Imageries. It was a proud moment when the Forest Survey of India Report of 1993, reported that the canopy cover in the Melghat Tiger Reserve area had improved. But today when the focus has shifted to Biodiversity Conservation improvement of canopy cover does not entitle us to rejoice because in the sphere of Biodiversity parallel improvement of the other components is also necessary.

The earlier flora of Melghat Tiger Reserve by Dr.M.A.Dhore and P.A.Joshi has enlisted 625 species and to reassess the changes in Biodiversity the Directorate of Melghat Tiger Reserve took initiative to update the flora of Melghat with the help of Dr. Prabha Y. Bhogaonkar and Shri Vinod D. Devarkar of Vidarbha Mahavidyalaya, Amravati. The authors painstakingly carried out the field survey and 67 plant species, 19 monocots and 48 dicots were identified.

This technical bulletin No. 7 includes detailed illustrations of all the species, which will contribute positively in helping Taxonomists, Foresters, Wildlife Managers and Botanists of the country.

Dr. P.Y.Bhogaonkar, Shri V.D. Devarkar and the team of Melghat Tiger Reserve Directorate deserves congratulations for the efforts in bringing out this 'Addition to the Melghat flora bulletin'.

A.N.Ballal

Principal Chief Conservator of Forests,  
Maharashtra State, Nagpur.





Melghat the land of the "Rugged Terrain & Bountiful Nature"



Vegetation is an important component even for a mammal like ' Tiger.'

## INTRODUCTION

Melghat area (Dist. Amravati, Maharashtra) has an expanse of nearly 3575 Sq.Km with good forest cover. Tiger reserve covers the total area of 1676.93 sq.kms. out of which 316.28 sq.kms. is the core area, 1360.65 sq. kms. is the buffer area of which 788.75 sq.kms. Such a protected forest is a dreamed paradise for any student of botany. Though the forest is of dry deciduous type, there are several valleys and cliffs which remain wet for maximum period of the year. Due to the protection given plants are on their own to grow, reproduce, exchange their genes, evolve and adjust freely to their ecological niche. Biodiversity is expected to be high under such conditions. The maximum rainfall noted in Melghat is around 150 cm. with maximum of 73 rainy days per year. Though summer months are dry, relative humidity is very high during monsoon. This offers a good opportunity for even temperate ephemeral species to grow during rainy season.

Recently M.A. Dhore (1988) has extensively surveyed the Melghat Tiger Reserve. The species reported here are those, missed by him. These infact are simply additions to his list. Some of the monocots have already appeared in Flora of Maharashtra state - Monocotyledons (BSI 1996). Voucher specimens are deposited in the herbarium of P.G. Department of Botany, Govt. Vidarbha Mahavidyalaya, Amravati.

*Geranium mascatense* Bioss., *Senecio chrysanthemoides* Dc., *Peristylus constrictus* (Lindl.) Lindl., *Apium graveolens* Linn. are temperate species. Out of these *Peristylus constrictus* (Lindl.) Lindl. according to Mudliar (1991) is represented only in East and North East India and Himalayas and its presence in Melghat represents an extended distribution. *Senecio chrysanthemoides* Dc. and *Apium graveolens* Linn. are also Himalayan or high altitude species in wild. Occurrence of high altitude species may at first glance appear surprising. However, if we look into mushroom flora of Melghat, We find species like *Morchella conica* Pers. reported from Melghat by Ghurde & Wakode (1981). Earlier the species were known to occur only in Jammu, Kashmir and Hills of Uttar Pradesh (Wakode 1993). This gives an indication about the likely presence of high altitude or temperate species in Melghat.

Present re-exploration of about one and half year has resulted in addition of 67 species to the earlier reports of Angiosperms. 10 genera, 44 species, one subspecies, one variety and two variations (total of 48 taxa) are being added to the list of dicots. Out of these 13 are first reports for Maharashtra and 12 for Vidarbha region. For monocots the addition is of 8 genera & 19 species. Botanical Survey of India intensively surveyed the vegetation of Maharashtra and has published monocot flora of Maharashtra (1996). Present study adds up one more species viz. *Eulophia pratensis* Lindl. to this list. Two of the species are first reports for Vidarbha.

Many of the species included in the following text, though are first reports for Maharashtra or Vidarbha, they have been already reported from Panchmarhi & Bori Hills of Madhya Pradesh. Out of 67 species reported, two are of interest from conservation point of view. *Achyranthes coynei* Sant. was known from only one locality i.e. Khandala, Dist. Pune. It was collected only once by Satapau. After that no one has reported the species from any of the locality. (R.D.B. 1988). BSI has suggested to relocate the plant and to introduce them into experimental gardens. We found a small population of 8-10 plants on Makhala plateau near Forest Rest House. Another species *Ceropegia oculata* Hook. is endemic to Maharashtra, so far known to occur in Pune, Ratnagiri and Raigad dist. The species was collected from Bhoot Khora of Makhala. It is an endangered species and BSI has suggested in situ conservation of the species as efforts to grow the plants in experimental gardens has failed.

Besides above two species, presence of *Aroipis peltata*, *Drosera indica* - an insectivorous plant; many species of *Habenaria*, and *Senecio*, medicinally important *Curculigo orchoides*, a rare species - *Smithia bigemita* etc. make Makhala plateau and valleys around it e.g. Bhoot Khora, important from vegetational point of view. We therefore sincerely suggest that this region should be protected from biodiversity conservation point of view. More through exploration of this region is hoped to bring some more interesting species in light.





*Cleome papillosa*, Steud. First record for Maharashtra State & Melghat



*Parastylis constrictus* (Lindl.) Lindl. Found only in E. Himalayas & Melghat.

## ACKNOWLEDGEMENTS

It is our pleasure to thank Shri. A.N. Ballal, P.C.C.F Maharashtra State, Nagpur and Shri. M.G. Gogate C.C.F. Wildlife for giving their consent to publish this survey.

We express our deep sense of gratitude to Dr. V.N. Naik, a renowned Taxonomist of India, who is a constant source of inspiration to all students of taxonomy.

We wish to express our heartfelt thanks to Mr. Anil Rode (Principal Investigator Madhughat Prkalpa, Amravati.) It was during the ethnobotanical survey carried out by him, that most of the plants reported here were collected. We sincerely thank Mr. Ramakant Surpatane for his valuable help during field work.

Our thanks are also due to Mr. V.T. Patki, Conservator and Field Director, Tiger Project and Mr. Ravindra Wankhade, Deputy Field Director, Tiger Project for their interest and encouragement.

Youth Hostels Association, Amravati Branch has helped from time to time to carry out this survey by arranging treks along unconventional routes with the help of Forest Department.

We are greatly thankful to Mr. Ajay Pillarisett, Documentation Officer, Tiger Project, Madhughat, who has taken all pains for the field work and publication of this bulletin.

We thank Dr. V.N. Naik, Aurangabad and Botanical Survey of India, Pune, for confirmation of some of the identifications.

Our thanks are also due to Dr. Mrs. Vijaya Dabir. Ex Principal, Govt Vidarbha Mahavidyalaya, Amravati and Shri. A.R. Kulkarni, Head of the Department of Botany, for their constant encouragement and for providing necessary library and laboratory facilities. We are also thankful to our enthusiastic colleagues Dr. Malode, Dr. Kale & Dr. Dongarwar for their help in field work.

How can we forget to thank Mr. Yadao Bhogaonkar and Mr. Shyam Deshpande for their keen interest and all time help.

**Vinod Devarkar**  
Research Student  
P.G. Deptt. of Botany  
Govt. Vidarbha Mahavidyalaya  
Amravati.

**Dr. Prabha Bhogaonkar**  
Reader  
P.G. Deptt. of Botany  
Govt. Vidarbha Mahavidyalaya  
Amravati.



## DIAGNOSTIC INDEX FOR FAMILIES, GENERAS AND SPECIES

- Leaves net venied, flowers 4-5 merous.
    - Petals free.
      - Leaves alternate; flowers tetramerous; gynophore usually present.
        - Plants glandular hairy; flowers pink; gynophore absent; capsules elongate cylindrical
      - Leaves alternate; flowers pentamerous; capsules laterally compressed, seeds pendulous.
        - Herbs; petals 3, lower one keeled and crested, flowers rose pink, capsule elliptic oblong
    - Leaves alternate, stipulate; stamens many, fused to form a staminal tube, anthers monothecous, reniform
      - Leaves dentate, retuse; involucre bracts absent; flowers yellow, staminal tube divided at top into numerous antheriferous filaments.
    - Leaves alternate, stipulate; stamens various, connate, 5-many, anthers ditheous.
      - Flowers yellow, in axillary sub-sessile heads, stamens 5, monadelphous; capsule 1-seeded
    - Herbs; leaves compound or lobed; stamens few, free
      - Leaves palmately partite; flowers rose-purple; styles separating from receptacular column carrying with them mericarps
  - Leaves compound; stamens few monadelphous
    - Leaves pinnately many foliate, sensitive to touch
      - Uppermost pair of leaflets vertically oriented; peduncles long, flowers sessile
      - All leaflets horizontally oriented, peduncles comparatively shorter, flowers pedicelled
    - Leaves palmate compound, not sensitive to touch, pubescent; peduncles longer than leaf
- Fruit legume; corolla papilionaceous
  - Leaf simple :
    - Lower leaves orbicular - obvate, upper linear - ovate; flowers small
  - Leaf trifoliate:
    - Seeds strophiole; flowers yellow
      - Flowers in long peduncled few flowered racemes; pods blotched yellow & brown; hairy, hairs spreading; strophiole large, divided
      - Flowers 1-2, axillary, shortly pedicellate; pod velvety hairy; strophiole not divided
    - Seeds without strophiole; flowers yellow or otherwise:
      - Terminal leaflet large, orbicular; lateral small, stipule like; flowers orange - yellow
      - Terminal leaflet not large; flowers white, purple spot on standard

----- DICOTYLEDONS

----- POLYPETALAE.

----- CAPPARIDACEAE.

---- 1. *Cleome papillosa* Steud.

----- POLYGALACEAE.

----- 2. *Polygala persicariaefolia* DC.

----- MALVACEAE

----- 3. *Sida rhombifolia* Linn  
ssp. *retusa* (Linn.) Bross.

----- STERCULIACEAE.

----- 4. *Waltheria indica* Linn.

----- GERANIACEAE.

----- 5. *Geranium mascatense* Bioss.

----- OXALIDACEAE

----- *Biophytum*

----- 6. *B. candolleianum* Wight.

----- 7. *B. reinwardtii* Walp.

----- 8. *Oxalis pubescens*  
H.B.&K.

----- FABACEAE

--- 9. *Alysicarpus ovalifolius*  
(Schumach.) J. Leonard.

--- *Atylosia*

--- 10. *A. platycarpa* Benth.

--- 11. *A. rugosa* Wight & Arn.

----- 12. *Eleiotis monophylla*  
(Burm.f.) DC.

----- 13. *Macrotyloma uniflorum* (Lam.) Verdc.

- Stipules adnate, membranous, large; flowers yellow enclosed in stipule like bract
  - Leaf many foliolate, rachis with two spines; flowers yellow
  - Fruit legume; corolla not papilionaceous; stamens free
    - Hirsute shrubs. Leaf unipinnate; nectary gland at the base of petiole; rachis extended beyond leaflets
  - Ovary inferior, placentation parietal
    - Connective produced beyond anthers
      - Fruits globose, echinate
      - Fruits ellipsoid, hairy
    - Connective not produced beyond anthers, flowers subtended by spatheaceous bracts
  - Leaves decomposed; inflorescence umbel; ovary inferior
    - Leaf segments filamentous; inflorescence leaf opposed; bracts & bracteoles absent
  - Petals fused
    - Ovary inferior; inflorescence head or capitulum
      - Florets all tubular;
        - Marginal florets filiform; anthers tailed
          - Large perennial shrubs; involucre bracts purple; florets yellow-orange
          - Erect or procumbent herbs, densely hairy; florets yellow; anthers fertile to various degree
        - Erect glabrous, tall herbs; florets yellow; anthers all fertile
      - Marginal florets filiform; anthers not tailed
        - Plants without wooly tomentum, florets faint pink
        - Plants with wooly tomentum florets yellow
      - All florets similar; anthers not tailed; involucre bracts deflexed; florets violet
    - Outer florets ligulate, inner tubular;
      - Bracts in more than one series
        - Peduncle enlarged below receptacle; achenes ribbed
        - Peduncle not enlarged below receptacle; achenes not ribbed
      - Bracts in one series
        - Leaf bases auricled; pappus absent
        - Leaf bases not auricled; pappus present;
          - Radical leaves purple, spatulate, lobed; anthers short, filaments long
          - Radical leaves green, entire, not spatulate; anthers long, filaments short
    - Leaves rosette and cauline alternate. Calyx tube adnate to ovary; stamens as many as corolla lobes. Ovary inferior or half inferior
      - Flowers purple, capsule dehiscence loculicidal
- 14. *Stylosanthes fruticosa* (Retz.) Alston.
  - 15. *Sesbania bispinosa* (Jacq.) Steud.
  - CAESPALPINIACEAE.
  - 16. *Cassia hirsuta* Linn.
  - CUCURBITACEAE
  - Cucumis*
  - 17. *C. prophetarum* Linn.
  - 18. *C. setosus* Cogn.
  - 19. *Momordica balsamina* Linn.
  - APIACEAE
  - 20. *Apium graveolens* L.
  - GAMOPETALAE
  - ASTERACEAE
  - Blumea*
  - 21. *B. jacquemontii* Hook.
  - 22. *B. oxydonta* DC. var. *erecta* Naik et Zate.
  - 23. *B. virens* DC.
  - 25. *Conyza canadensis* (L.) Cronquist.
  - 26. *Gnaphalium pennsylvanicum* Willd.
  - 24. *Centrantherum phyllolaenum* Benth.
  - 27. *Pulicaria wightiana* (DC.) CL.
  - 31. *Vicoa cernua* Dalz.
  - Senecio*
  - 28. *S. belgumensis* C.B.Cl.
  - 29. *S. chrysanthemoides* DC.
  - 30. *S. nudicaulis* Buch.
  - CAMPANULACEAE
  - 32. *Campanula benthamii* Wall.



- Ovary superior; carpels united by styles, pollen not aggregated into pollinia
    - Large straggling shrubs; inflorescence paniculate; flowers white; fragrant
  - Ovary superior; carpels united at stigmatic disc, pollen aggregated into pollinia
    - Herbaceous climbers, leaves membranous, flowers greenish purple, corolla lobes united at tips
  - Leaves opposite; corolla regular; stamens five, carpels united, placentation axile
    - Small herbs; inflorescence dichotomously branched; flowers white; capsule 2 horned
  - Leaves opposite, 3 - nerved, flowers 4-5 merous; ovary 2- celled, placentation axile or parietal
    - Flowers regular, tetramerous; stamens sulphur yellow
      - Large herbs, flowers large, white with bright violet spot at tip the of corolla
      - Small herbs with dark blue flowers
      - Small delicate herbs with faint blue flowers
  - Leaves alternate; corolla campanulate or infundibuliform, plicate in bud; fruit a capsule; seeds few
    - Climbers, leaf trilobed, flowers rose - pink
    - Creepers, leaf tridentate at base, flowers creamish white
  - Leaves alternate; corolla rotate; ovules & seeds many
    - Plants with spines, flowers white
  - Leaves usually opposite, flowers zygomorphic, stamens 4, seeds many
    - Aquatic delicate herbs; flowers white, bilipped; stamens two
  - Leaves opposite. Corolla usually bilipped; stamens 4 or 2; fruit a loculicidal compressed capsule
    - Flowers in unilateral inflorescences, flowers white, spotted with purple; stamens 2
    - Inflorescence subradical as well as axillary; bilipped; stamens 4
    - Inflorescences not hairy; bracts spiny, recurved, purple dimorphic, flowers purple
      - Inflorescence densely hairy; bracts spiny; flowers cream yellow or white
  - Shrubs; inflorescence compound dichotomous, paniculate; flowers white, one lip narrow upcurved, stamens 2
  - Flowers with perianth in one whorl
    - Herbs, flowers in terminal spikes or cymes; bracts and bracteoles present; perianth 5, free; stamens opposite the perianth; connate
    - Whole plant purple, glabrous; flowers deflexed; sessile
- APOCYNACEAE
- 33. *Ichnocarpus*  
*ovatifolius* A.DC.
- ASCLEPIADACEAE
- 34. *Ceropegia oculata* H.
- LOGANIACEAE
- 35. *Mitreola petiolata*  
(Gmel.), Torr. & Gray.
- GENTIANACEAE
- Exacum*
- 36. *E. bicolor* Roxb.
- 37. *E. lawii* C.B. Clarke.
- 38. *E. pumilum* Griseb.
- CONVOLVULACEAE
- 39. *Ipomea triloba* Linn.
- 40. *Merremia tridentata*  
(L.) Hallier.
- SOLANACEAE
- 41. *Solanum torvum* Sw.
- SCROPHULARIACEAE
- 42. *Dopatrium lobelioides*  
(Retz.) Benth.
- ACANTHACEAE
- 43. *Androgaphis*  
*paniculata* Wall.
- Lepidagathis*
- 44. *L. brandraensis*  
Blatter.
- 45. *L. lutea* Dalz.
- 46. *Rhinacanthus*  
*communis* Nees.
- MONOCHLAMYDEAE
- AMARANTHACEAE
- 47. *Achyranthes coynei*  
Santapau

- Flowers unisexual, ovary unilocular, style undivided
  - Succulent herbs, leaf dentate; flowers in axillary sessile, unisexual heads
- Plants truly herbaceous; leaves usually with parallel veins, flowers trimerous
  - Perianth petaloid; flowers bisexual; ovary inferior
    - Leaves on pseudobulbs, lip shortly spurred, flowers yellow, pollinia waxy
  - Tuberous; lip prominently spurred; pollinia granular
    - Stem leafy upwards, petals bifid, lip trifid, segments narrow; spur club shaped as long as ovary
  - Petals entire
    - Spur curved, shorter than ovary
    - Spur long, nearly 12 - 14 cm.
- Plants tuberous; unifoliate, leaf ovate orbicular, crenate
- Pollinia granular; ovaries erect and parallel to peduncle; stem leafy in the middle
  - Flowers snow white, fragrant; lip longer than sepals
- Flowers Pinkish brown, lip shorter than sepals
- Perianth petaloid; ovary inferior
  - Spikes comose, erect, lateral staminodes petaloid; anther bases spurred
    - Root stocks small, leaves 6 - 7 inches, spikes small few flowered
    - Rhizomes large, leaves 16 - 18 inches, spikes long, many flowered
  - Stems 3 - 4 feet; spikes basal hardly coming out of soil
- Perianth petaloid; ovary superior
  - Root fibres ending in tubers, racemes large, unbranched, flowers white, capsule 3 - winged
- Bulbous plants, bulbs tunicated; perianth campanulate 6 - partite
- Perianth with 3 petaloid segments, ovary superior
  - Leaves grass like; cymes panicled, naked; flowers blue; stamens 3
- Perianth reduced to scales or absent; inflorescence spadix
  - Plants growing in the crivices or hollows of *Ficus* tree
- Spadix with barren terminal appendage food bodies present above female
  - Spadix not foul smelling, leaves with bulbils
  - Spadix foul smelling, leaves without bulbils
- Spadix on short stalk; fruit globose, berries red
- Flowers and leaves present together; spadix with sterile flowers above and below the staminate flowers

-----URTICACEAE

- 48. *Elatostema*  
*surculosum* Wight.

MONOCOTYLEDONS

-----ORCHIDACEAE

- 49. *Eulophia pratensis*  
Lindl.

-----*Habenaria*

- 50. *H. digitata* Lindl.

- 51. *H. hollandiana* Sant.

- 52. *H. Ingenicorniculata*  
Grah.

- 54. *Nervilia aragoana*  
Gaud.

----- *Peristylus*

- *P. constrictus*(Lindl)  
Lindl.

- 56. *P. plantagineus* Lindl.

----- ZINGIBERACEAE

- Curcuma*  
57. *C. decipiens* Dalz.

- 58. *C. inodora* Blat.

- 59. *Zingiber nimmonii*  
(Nimmo).in Dalz.&Gibs.

----- LILIACEAE

- 60. *Chlorophytum*  
*glaucum* Dalz.

- 61. *Drimia indica*  
(Roxb.) Jessop.

----- COMMELINACEAE

- 62. *Murdania semiteres*  
(Dalz.) Sant.

----- ARACEAE

- 63. *Ariopsis peltata*  
Nimmo.

- *Amorpho<sup>ph</sup>allus*

- 64. *A. bulbifer* Blume.

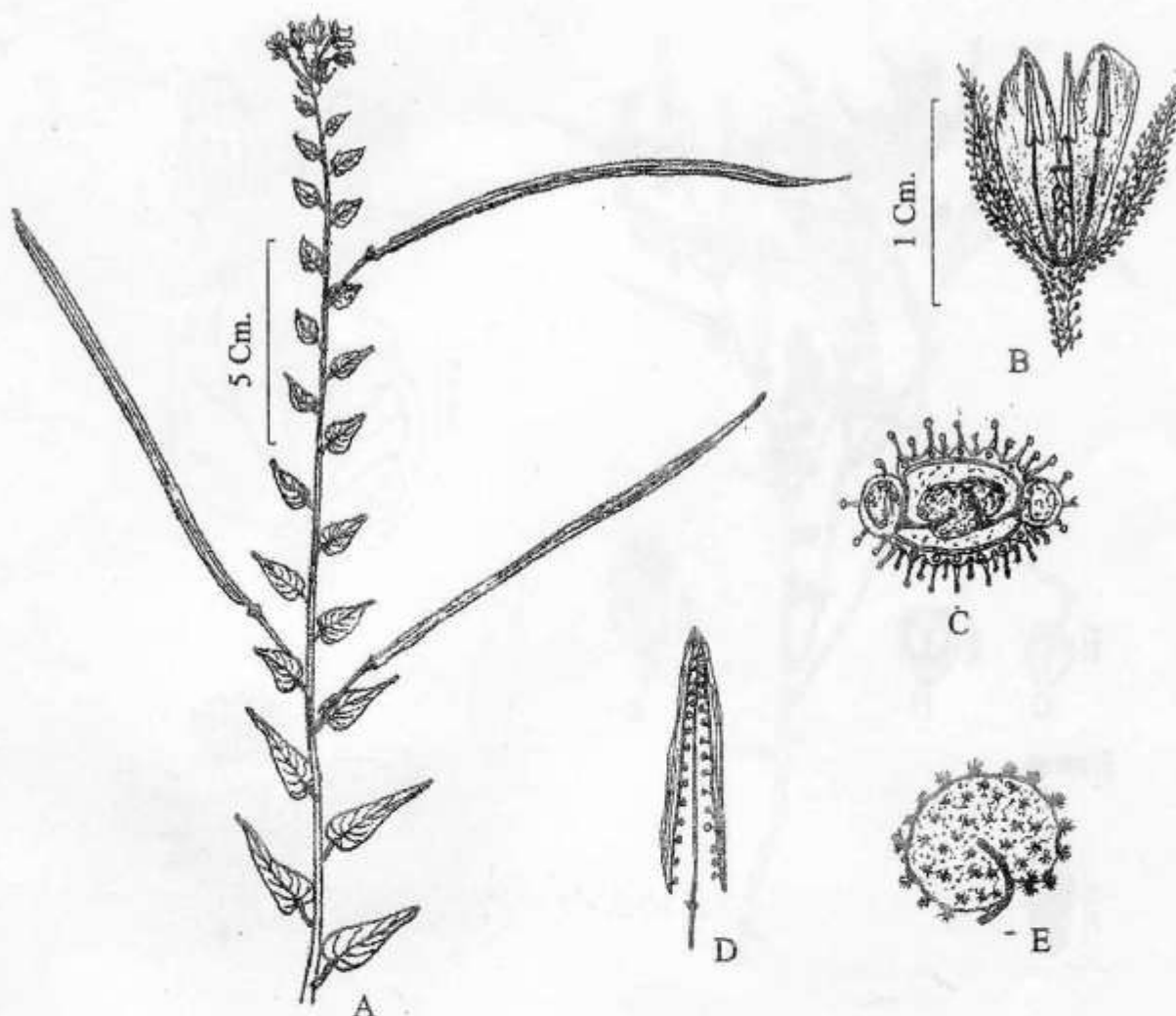
- 65. *A. commutatus*.  
(Schott) Engl.

- 66. *Sauromatum*  
*guttatum* Schott.

- 67. *Theriophonum*  
*minutum* Willd.



CAPPARIDACEAE  
*Cleome papillosa* Steud.



A - Habit sketch, B - L.S. Flower,  
 C - T.S. Ovary, D - Fruit, E - Seed.

*Cleome papillosa* Steud. Nomen.ed. 2  
 (1840) V.L.P.382 Hook.Fl. B.I.1:168; Woodr.in  
 Journ.Bomb.Nat.v.II (1987), p - 122.

Glandular hairy herbs, branching from base. Leaves small, alternate, petiolate, ovate-lanceolate, cordate at base. Flowers small, pink-lilac, in long slender bracteate racemes. Sepals 4, glandular; petals 4, clawed; stamens 6; gynophore 0. Capsule striate, long covered with glandular hairs. Seeds minute, brown-black, granulate, each granule with a tuft of 7 to 10 hairs, notched.

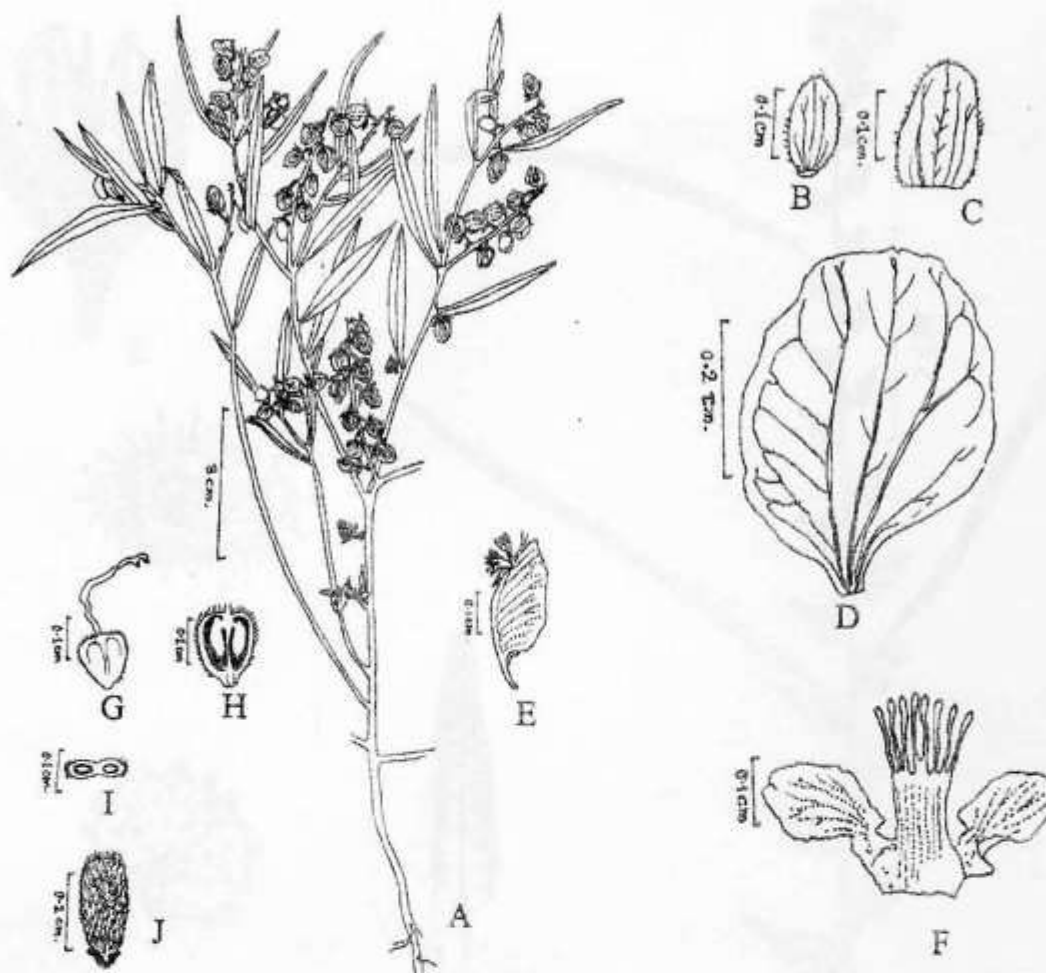
**Flrs. & Frts :-** Aug. - Sept.

**Locality :-** Rare. One plant was collected in 1994 at Behali. Few small stunted specimens were collected from Dharkhora in 1996 & again one specimen collected in 1997 along Dhamangaon Gadhi - Chikhaldara Road. In 1998 one large population was seen along Makhala Road.

**Exsiccata :-** PYB. 226.

Cooke (1903) described the seed as smooth. However, under compound microscope seed surface is granulate & hairy. Appears to be the first record for entire Maharashtra State. It has been described by Cooke (1903), from Sind and Karachi.

POLYGALACEAE  
*Polygala persicariaefolia* DC.



A - Habit sketch, B & C - Sepals, D - Wing sepal,  
 E - Lower petal, F - Staminal sheath & petals,  
 G - Gynoecium, H - L.S.Ovary, I - T.S.Ovary, J - Seed

*Polygala persicariaefolia* DC. Prodr. 1 : 326. 1824; Bennett. in Hook. Fl.B.I.1 : 202 : 1872; Chandrabose & Nair in Proc. Ind. Acad. Sci (Plant Sci.) 90 : 115. 1981.

Annual, erect herbs, appressed hairy, 15 - 30 cm. high. Leaves ovate lanceolate, 2.5 x 0.5 - 1 cm. acute both ends, hairy along margins. Inflorescence, terminal & axillary, racemose; flowers dark rose - pink, pedicellate; pedicels 1 - 2 mm. long thin; bracts minute, subulate, with broad membranous margins. Outer sepals unequal, 2 - 3 mm. long, wings broadly ovate, horizontally spread in flower, 15 - 7 mm across, conspicuously nerved, sub - petaloid. Petals rosy - pink, as long as the wings. Stamens 8; filaments united to the base; dehiscence porus. Ovary two celled, thickly hairy; style short, curved. Capsule obcordate, 2 - 3 cm. long, hairy. Seeds 3 - 4 mm. black, stropheolate; stropheole 3 lobed, covered with white hairs.

**Flrs. & Frts.** :- Aug. - Sept.

**Locality** :- Khandukheda, Masoondi.

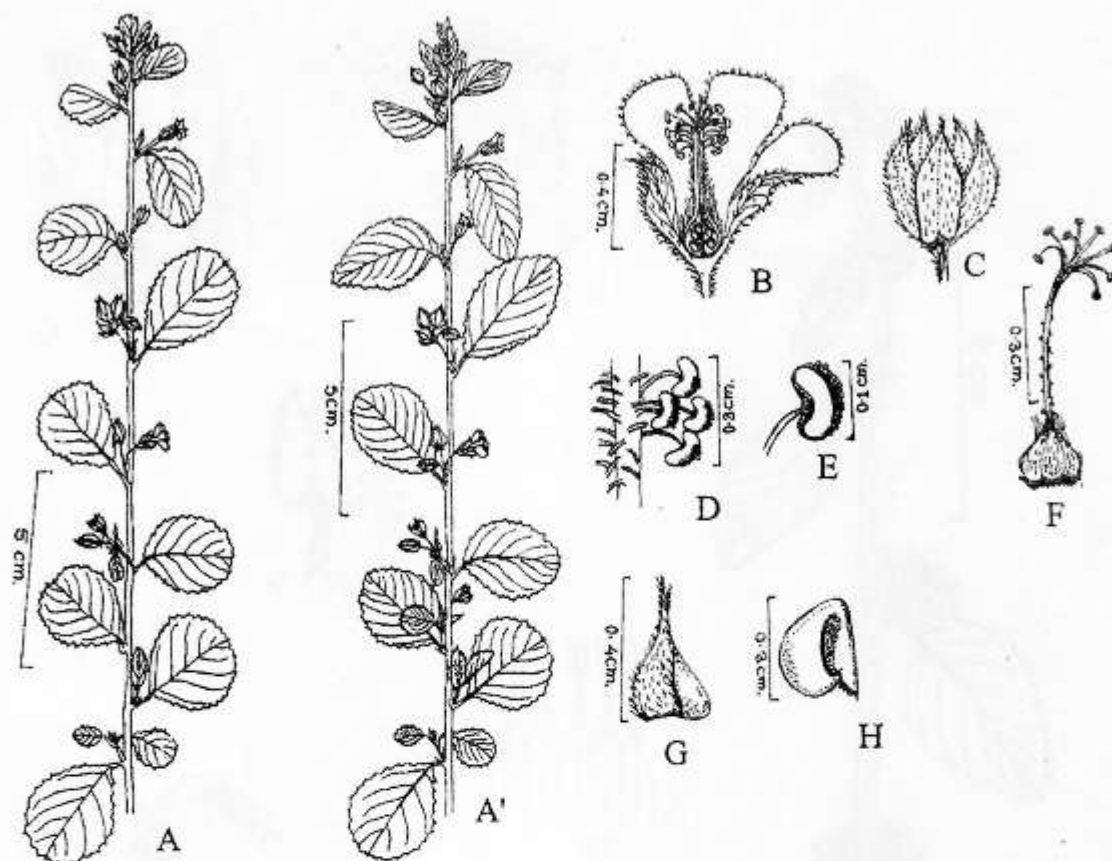
**Exsiccata** :- PYB. 227.

A distinct variant was collected from Narnala (PYB.228) Plants with much narrower, linear leaves. Flowers nearly 1/2 the size of those collected from Masoondi.



# MALVACEAE

*Sida rhombifolia* Linn. ssp. *retusa* (Linn.) Bross.



A & A' - Habit sketch, B - L.S. flower,  
C - Calyx, D - Androecium, E - Single stamen,  
F - Gynoecium, G - Single fruitlet, H - Seed.

*Sida rhombifolia* Linn. ssp. *retusa* (Linn.)

Bross. Shivarajan & Balchandran in *Aurvedic drugs and their plant sources* p. 71. 1994; *Sida retusa*, Linn. Sp.Pl.(ed.2) 961.1762 *S.rhombifolia* var.*retusa*. *Maters in Hook.Fl.B.I.* 1:324, 1874; Dalgado, 17, 1898; Cooke, 1:93 (99), 1901.

An erect woody herb, stellately hairy. Leaves obvate or truncate, cuneate at the base, coarsely toothed at the apex. Flowers shorter than leaf, yellow, axillary, solitary or in clusters of 2-3, peduncles longer than petiole. Sepals with prominent midvein, stellately hairy outside, teeth triangular. Petals entire, yellow, stellately hairy. Stamens indefinite, monadelphous, staminal tube hairy. Ovary lobed, hairy; style hairy; stigmas 8-10, capitate. Fruit schizocarp; each fruitlet hairy, bidentate; dents unequal, not spreading.

Flrs. & Frts. :- Sept. -Jan.

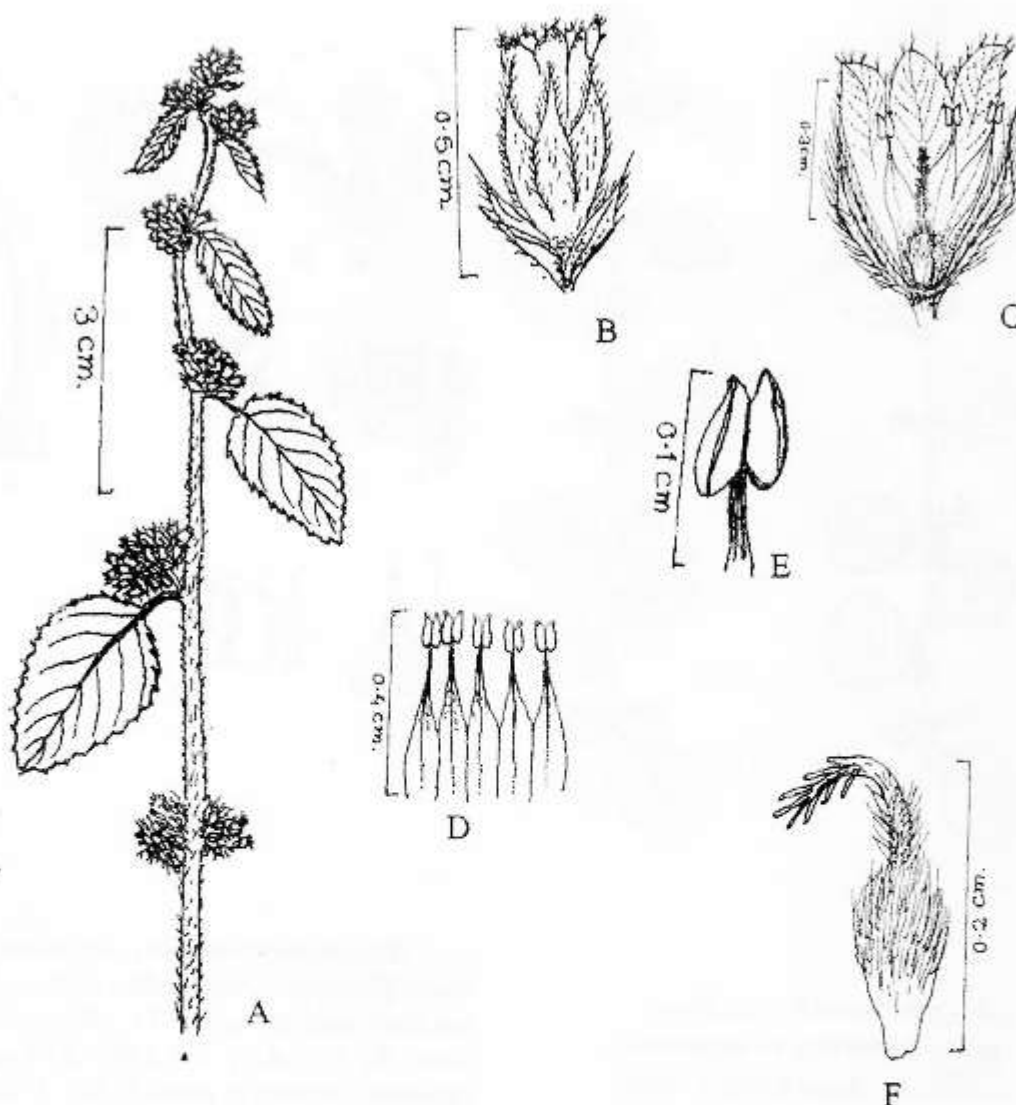
Locality :- Makhala.

Exsiccata :- PYB. & VDD. 260.

It appears that the present taxon shows many variations. Most of the authors consider it as either subspecies or variety of *Sida rhombifolia*, Linn. The taxon described by Shivarajan & Balchandran (1994) has distinctly notched leaves. Present specimens show member having all retuse leaves & member having a transition from retuse to ovate leaves. Almeida (1990) consider it as a distinct species. Observation of Melghat population does not justify the separate status of *Sida retusa*. However, the subspecies differs from the typical population of *Sida rhombifolia* where awns of the fruitlets are divaricate and equal.

First record for Vidarbha.

**STERCULIACEAE**  
*Waltheria indica* Linn.



A - Habit sketch, B - Single flower, C - L.S. flower,  
 D - Androecium, E - Single stamen, F - Gynoecium.

*Waltheria indica* Linn. Hook Fl. B. I. 1: 374;  
 1874, Cooke, Fl. Bomb. Pres. 1: 144. (1967).

Perennial erect herbs, 2-3 ft. high, softly pubescent; branching sparse, from base. Leaves stipulate; petiolate; ovate, dentate, velvety pubescent on both surface; veins impressed on upper surface; stipules subulate, hairy. Flowers in axillary or subsessile heads. Flowers small, faint lemon yellow coloured. Calyx companulate densely hairy, slightly shorter than corolla. Corolla hairy; petals not spreading. Stamens 5, immediately dilating little below the anther and uniting to form a staminal tube. Ovary densely hairy; style hairy; bright orange in colour; stigma fimbriate. Capsules bivalved; seed single.

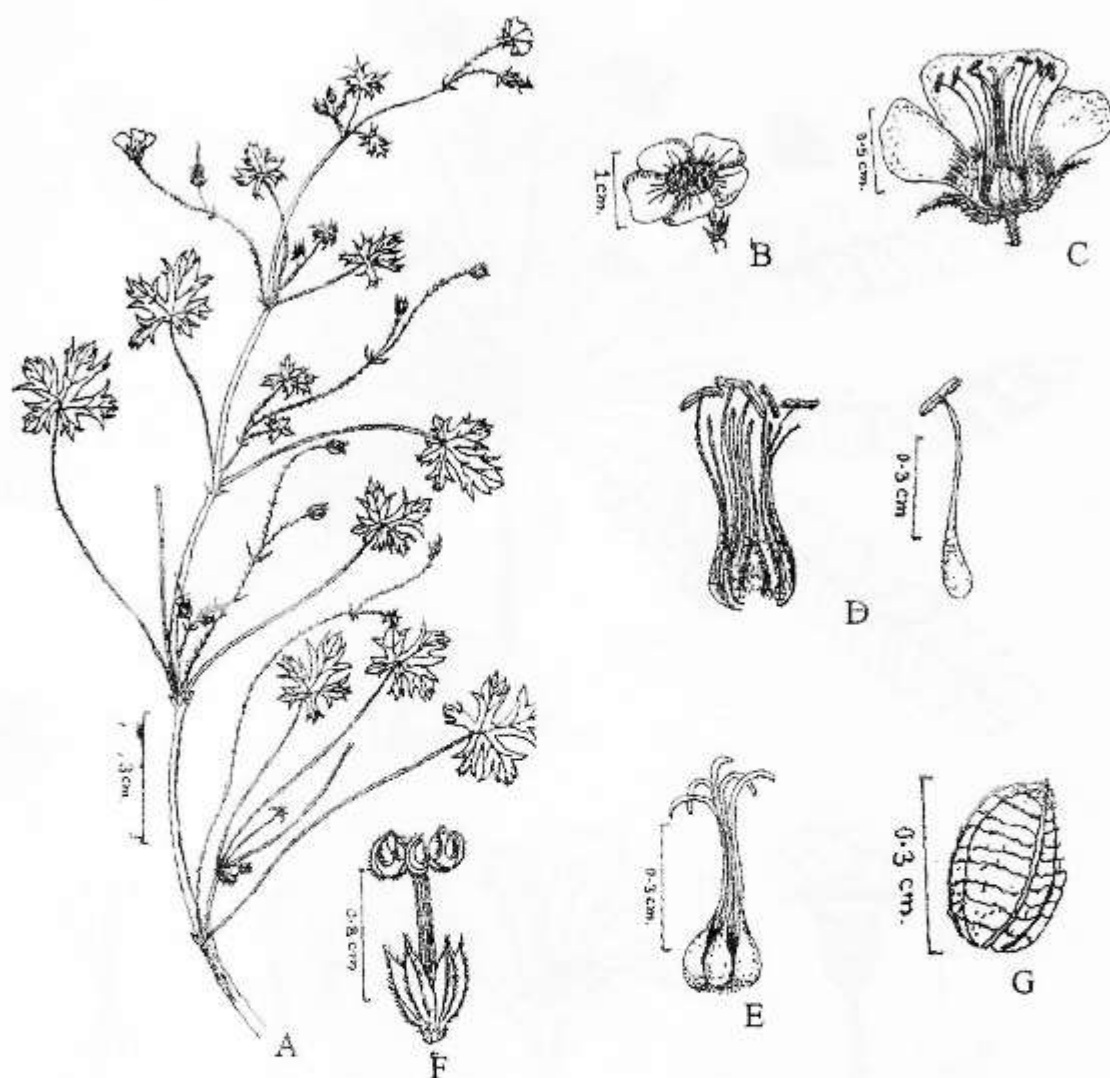
**Flrs. & Frts.** :- Oct. - Jan.

**Locality** :- Gullarghat MPCA Area.

**Exsiccata** :- PYB. 337.



**GERANIACEAE**  
*Geranium mascatense* Bross.



A - Habit sketch, B - Single flower,  
C - L.S. flower, D - Androecium & single stamen,  
E - Gynoecium, F - Fruit, G - Seed.

*Geranium mascatense* Bross. Diagn. 1 : 59.  
184; Babu, Herb. Fl. Dehra Dun 100. 1977. *Geranium ocellatum*, Cambess. in Jacq. Voy. Ind.  
33.t.38.1844; Edgew & Hook. Fl. B. I. 1:433.

Annual, much branched pubescent herbs. Plants grow to form a dense cushion. Leaf long petioled; stipulate; palmately 5 lobed. Flowers beautiful, in terminal 2 - 3 flowered cymes. Sepals 5, imbricate; 2 broad, 3 narrower, hairy. Petals 5, twisted, Corolla lilac - pink with dark purple centre. Gynoecium of 5 free ovaries; styles fused with central column. At maturity fruitlets get dispersed leaving behind the stylar stump. Ripe carpels and lower part of the styles coiling upwards with a jerk and ejecting the seeds.

**Flrs. & Frts.:-** Oct. - Dec.

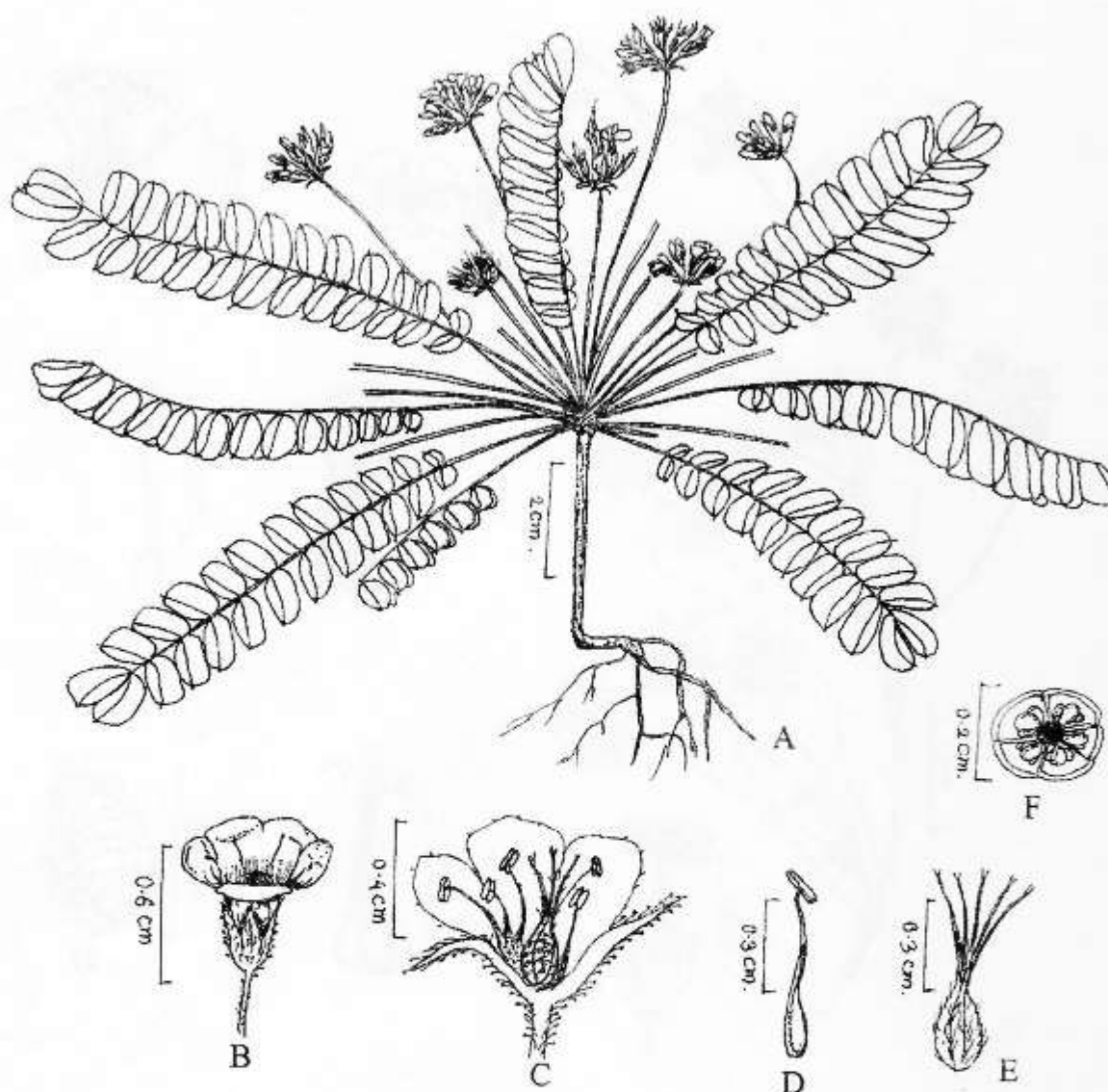
**Locality :-** Rare. At higher elevation along moist - slopes in the interior of the forest.

**Exsiccata :-** PYB. 221.

The species is not recorded from any of the other region of Maharashtra.

# OXALIDACEAE

## *Biophytum candolleianum* Wight.



A - Habit sketch, B - Single flower, C - L.S. Flower,  
D - Single stamen, E - Gynoecium, F - T.S. Ovary.

*Biophytum candolleianum* Wight. Fyson  
F1. South Indian Hill. St. 1932. P. 77. *B. sensitivum*  
var. *candolleianum* : Hook. F1.B.I.1: 437

Erect unbranched small herbs. Stem 8 - 12 cm. with a crown of leaves at its apex. Leaves paripinnate, 8 - 10 cm. , petiolate; petioles 2.5 - 3 cm.; leaflet's 8 -15 pairs, sessile. Leaflets of the upper most pair characteristically coming close together. Peduncles long, 6 - 8 cm. Flowers in umbellate heads, subsessile, bright yellow, bracteate, bracts acuminate. Sepals glandular pubescent, seven nerved , acuminate. Stamens 10, dimorphic. Ovary pentalocular placentation axile; ovules many; styles 5; stigmas obscurely noticed. Fruit ellipsoidal capsule, hardly exerting the calyx.

Flrs. & Frts. :- Aug. - Nov.

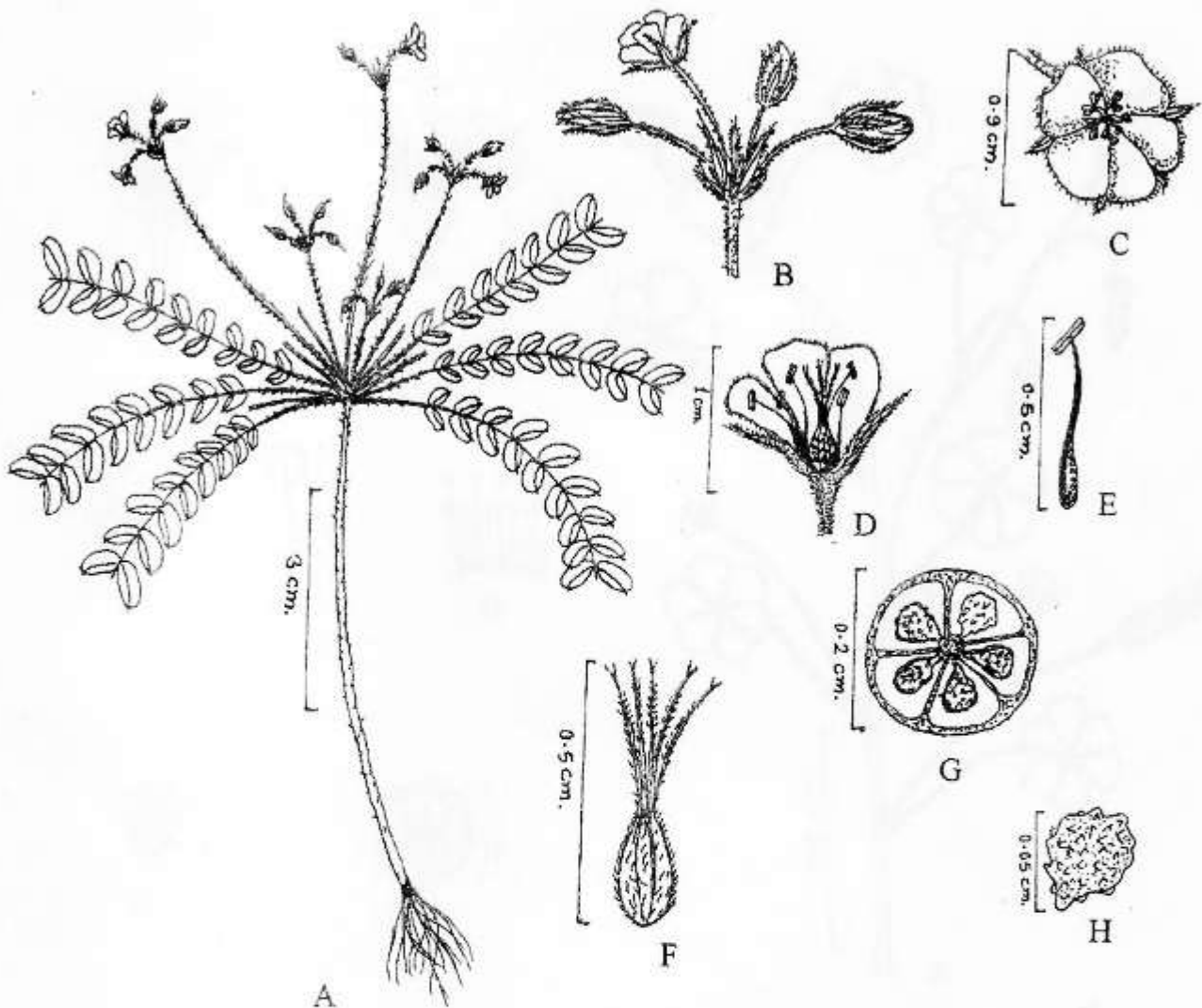
Locality :- Dharkhora, Gullarghat.

Exsiccata :- PYB. VDD. 230

At once distinct from *B. sensitivum* (L.) DC. by its long peduncled umbels and overall robust appearance.



**OXALIDACEAE**  
*Biophytum reinwardtii* Walp.



A - Habit sketch, B - Inflorescence,  
C - Single flower, D - L.S. flower, E - Single stamen,  
F - Gynoeceum, G - T. S. Ovary, H - Seed.

*Biophytum reinwardtii* Walp. Rep. I. 476;  
*Oxalis sensitiva*, Zucc. in Munch. Denks. ix. 183,  
t.v.8. *O. reinwardtii*, Zucc. in Munch. Abhand. i.  
274 *O. metziana*, Miq. in Herb Hohenack 144. *O.*  
*gracilentia*, Kuzz in Journ. As. Soc. Beng. 1870,  
ii. 68. *O. sensitiva*, Wall. cat. 4343 F.H. Rheede  
Hort. Ma. ix. 33, t. 19.

Small herbs. Leaflets 10 to 20 pairs, oblong, tip rounded, equal at the base, glabrous. Peduncles slender; pedicels equalling or exceeding the length of flowers. Flowers yellow with red streaks. Capsule almost equalling the sepals.

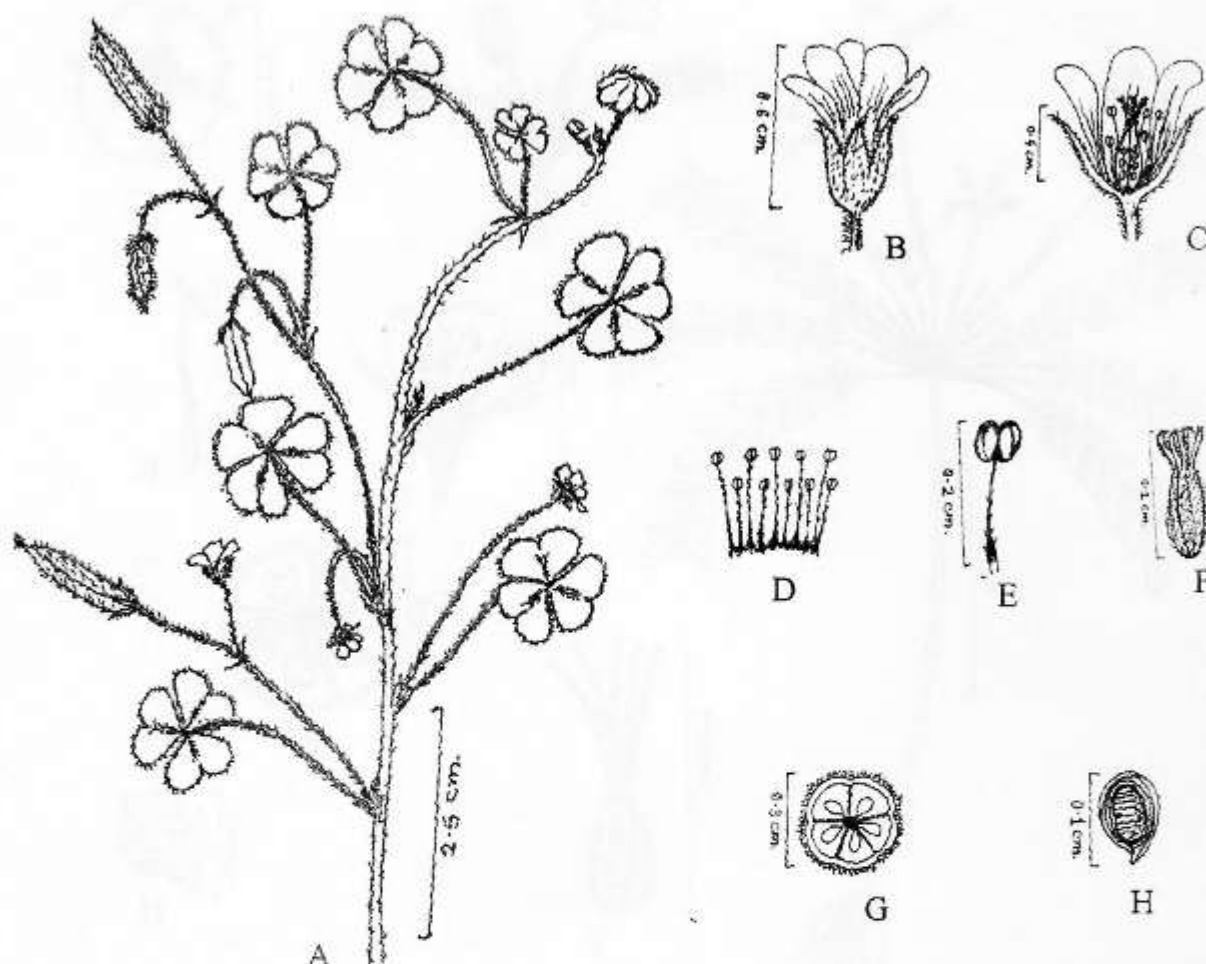
**Flrs. & Frts.** :- Aug. - Dec.

**Locality** :- Common at Semadoh.

**Exsiccata** :- PYB. 241a.

The species is not reported previously from Vidarbha. The differences between *B. sensitivum* (which is most common in the dist.) and *B. reinwardtii* are so subtle that previous authors might have missed it for the former.

**OXALIDACEAE**  
*Oxalis pubescens* H.B. & K.



A - Habit sketch, B - Single Flower, C - L.S. Flower,  
D - Androecium, E - Single stamen, F - Gynoecium,  
G - T. S. Ovary, H - Seed

*Oxalis pubescens* H.B. & K. in P.F. Fyson flora of South Indian Hills 1:74.1932.

Small pubescent herbs; stems creeping and erect, elongated, red. Stipules hairy. Leaf trifoliolate on long petiole; leaflets obcordate, margins hairy, red. Flowers in few flowered axillary umbels on long peduncles; peduncles longer than leaf. Calyx more than half of the corolla length. Petals yellow, obovate. Stamens 10, 5 shorter, 5 longer, all fused towards base; filaments hairy. Ovary single, hairy; styles free, 5; stigma obscurely bilobed. Fruit hairy, torulose, cylindrical capsule. seeds transversely ribbed.

Flrs. & Frts :- Sept. - Dec.

Locality :- Chikhaldara, higher plateau.

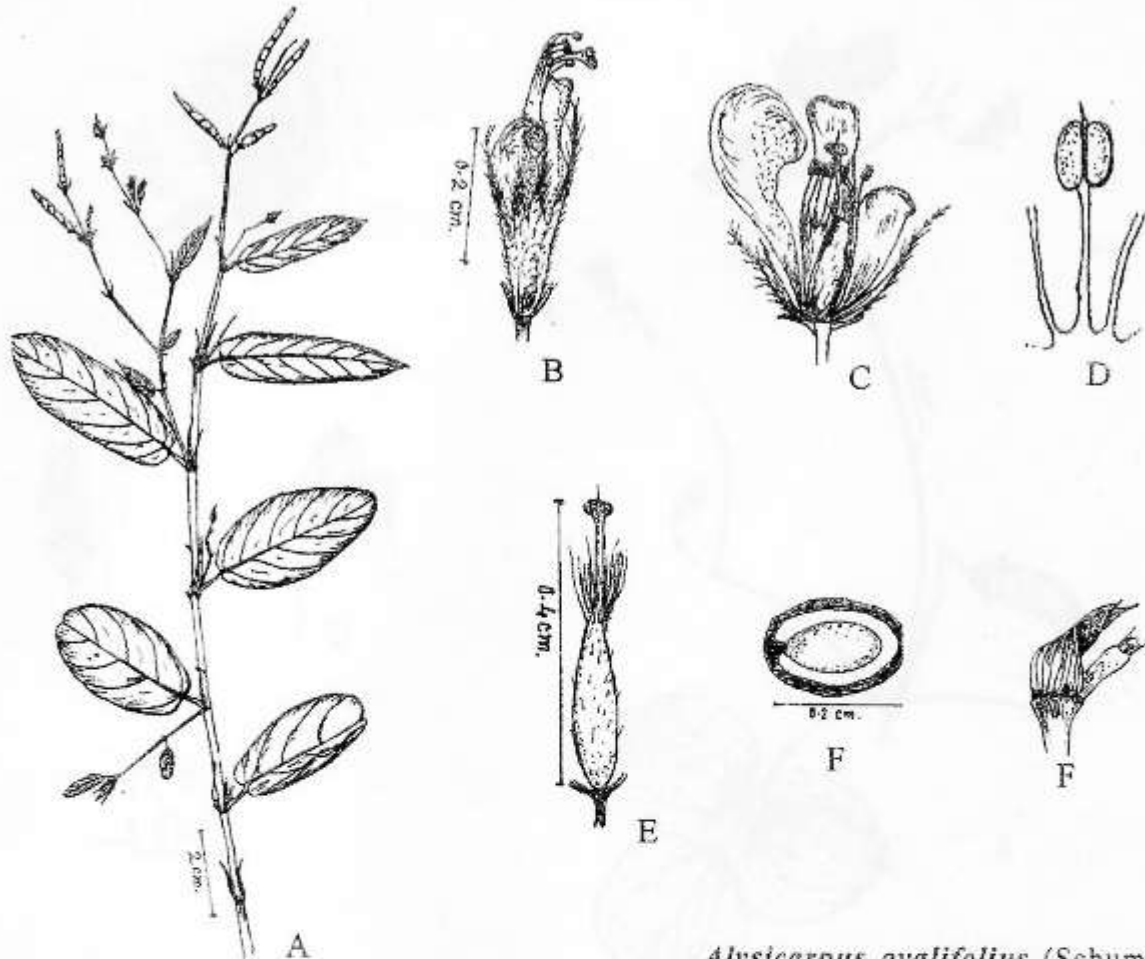
Exsiccata :- VDD. 1.

Much similar to *O. corniculata*, Linn. But differs in its red stems & leaf margins. Also peduncles are much longer. Relative lengths of styles & stamens vary even within the species. **First record for Maharashtra.**



# FABACEAE

*Alysicarpus ovalifolius* (Schumach.) J. Leonard.



A - Habit sketch, B - Single flower,  
C - L.S. flower, D - Single stamen,  
E - Gynoecium, F - T.S. Ovary, G. Stipule.

*Alysicarpus ovalifolius* (Schumach)  
J. Leonard in Bull. Jard. Bot. Brux. 24:88. 1954  
*Hedysarum ovalifolium*, Schumach. Beskr. Guin.  
Pl. 359. 1827, *Alysicarpus rupicola*,  
Edgew. J. Asiat. Soc. Bengal 21:1790. 1852. Naik.  
Fl. Marathwada. 1:246. 1998.

Prostrate or procumbent herbs: branches terete, striate, minutely pubescent, 20-50 cm. long. Leaves unifoliate; petioles 2 - 5 cm. long; stipules ovate - lanceolate 5 - 10 mm., glabrous, striate. Leaflets variable, obovate, elliptic, orbicular, ovate, linear - lanceolate, 1 - 6.5 to 1-2.5 cm, rounded or subcordate at the base, obtuse or acute, glabrous above and pubescent on nerves underside; petiolule minute, stipels obscure. Inflorescence lax, 6 - 10 flowered, simple or branched racemes, 6 - 12 cm, long; bracts, ovate - acuminate, longer than pedicels. Calyx hairy, striate, 2 mm. long; tube as long as the subulate, acuminate teeth. Petals deep violet. Standard orange coloured in bud. Stamens diadelphous, (9)+1, puberulous. Ovary cylindrical, 4 mm. long, tuft of hairs at the top of ovary. Style 2 mm long; stigma capitate, apiculate. Pods linear, 1.5 - 2 cm. long, compressed, 4 - 8 jointed, with a raised line between the joints, longitudinally striate, straw coloured.

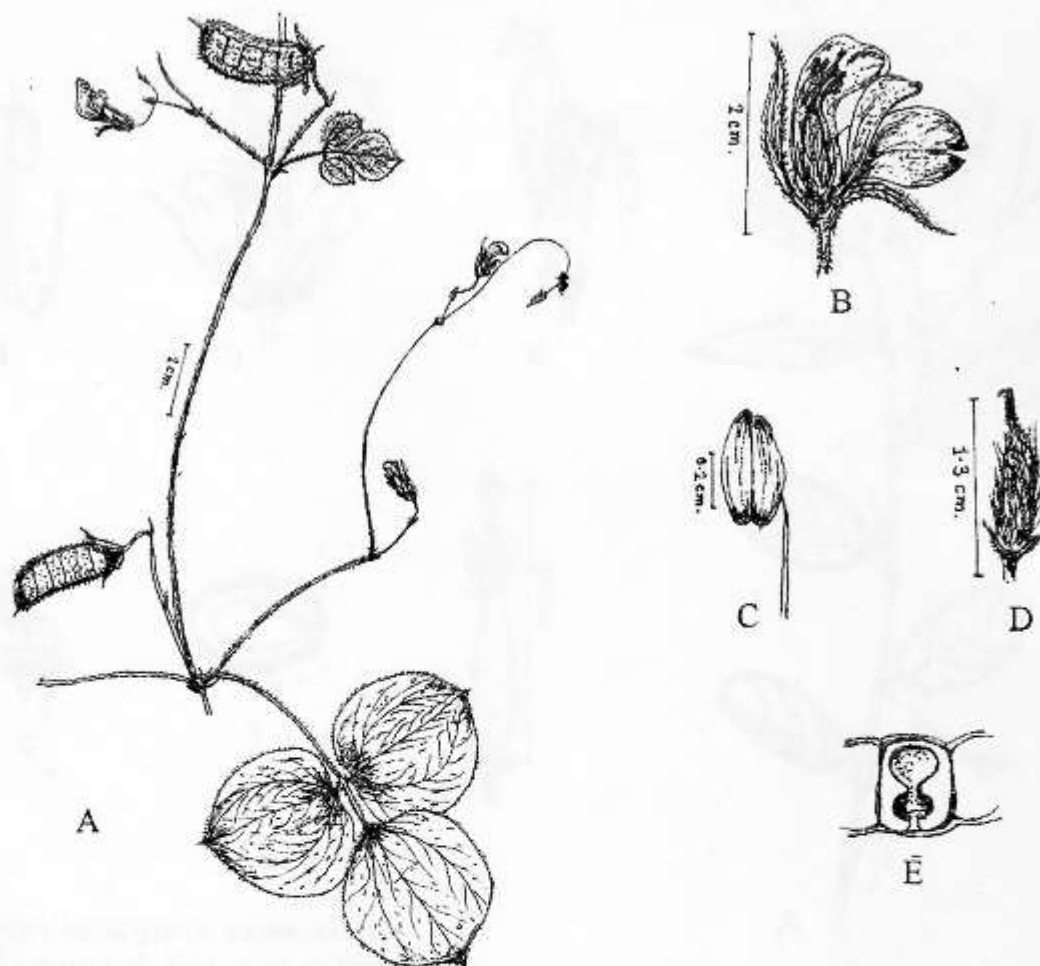
**Fls. & Frts. :-** Aug. - Dec.

**Locality :-** Kolkaz & Harisal.

**Exsiccata :-** PYB.301.

**First record for Vidarbha.** Also found in plains.

FABACEAE  
*Atylosia platycarpa* Benth.



A - Habit sketch, B - L.S. Flower,  
C - Stamen, D - Gynoecium, E - Seed.

*Atylosia platycarpa* Benth. Pl. Jungh. (1851 - 55) p. 243; Hook. Fl. B. I. 2 : 216; *Atylosia geminiflora*, Dalz. in Journ. Linn. Soc. v.13 (1873) p. 185; Baker, in Hook Fl. B. I. 2 : 212; Talb. trees, Bomb. p. 73; Woodr. in Journ, Bomb. Nat. v. 11 (1897) p. 425.

Slender twining or trailing herbs, clothed with spreading fulvous or gray hairs with bulbous bases; stem ribbed. Leaves trifoliate, stipulate; stipules small, narrow; petioles long, 5 cm; lateral leaflets shortly pedicelled, oblique, orbicular, broader than long, estipellate; rachis extended beyond the leaflets forming a long stalk to a terminal leaflet; lamina hairy, 3 nerved. Flowers in axillary, 1-3 flowered racemes. Flower bracteate, bracteolate; pedicels as long as or slightly longer than calyx. Corolla faint yellow, little exerted. Calyx should come before corolla. Calyx densely hairy, subulate; teeth longer than tube. Stamens diadelphous, uniform; ovary densely hairy. Pods broad, 3x 1 cm with long acumen; fruit wall densely hairy mottled with yellowish brown spots; depressed between seeds. Seeds 4-5 with large divided strophole.

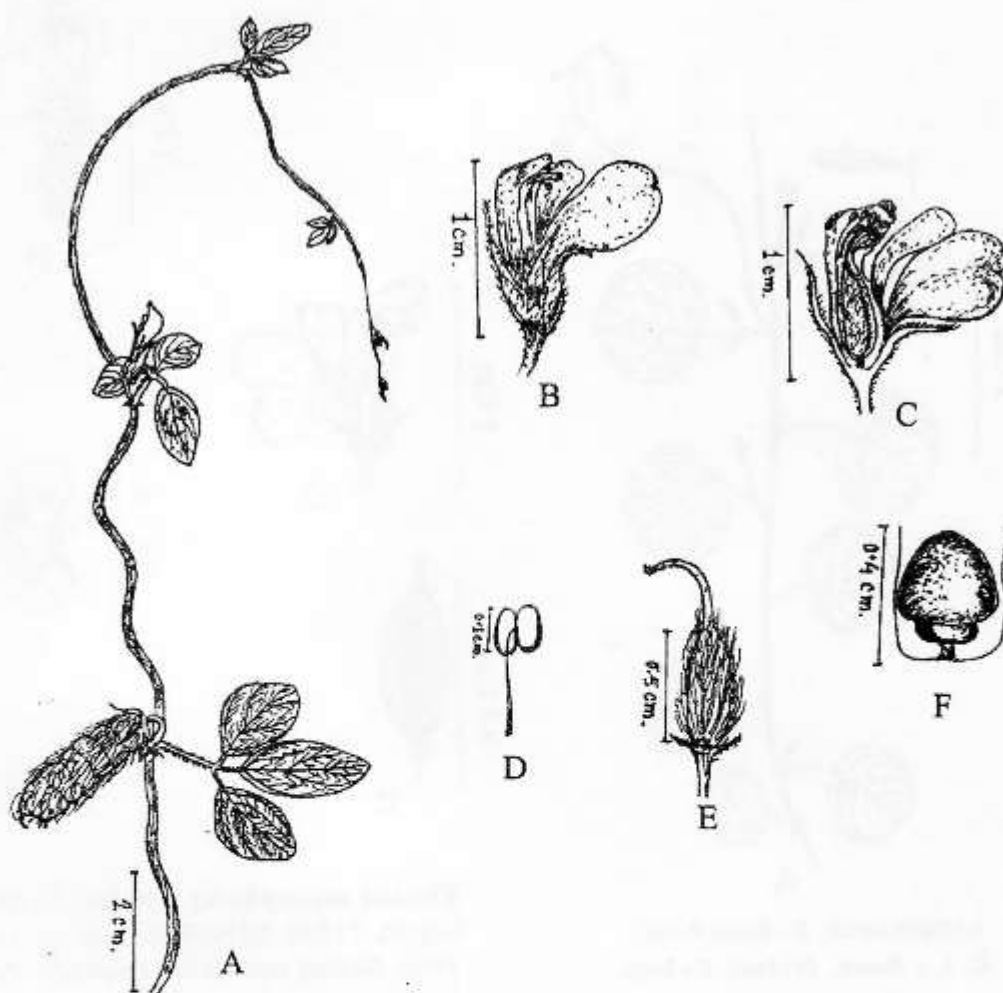
Flrs. & Frts. :- Aug. - Nov.

Locality :- Narnala fort.

Exsiccata :- PYB. 282.

Some of the inflorescences become long nearly upto 17 cms, flowers 3; widely spaced.

**FABACEAE**  
*Atylosia rugosa* Wight & Arn.



A - Habit sketch, B - Single flower, C - L.S. Flower,  
D - Single stamen, E - Gynoecium, F - Seed.

*Atylosia rugosa* Wight & Arn.; Pro dr.fl.  
Ind. Orient. 257. 1834; Hook Fl.B.I.2:215; Gam-  
ble Fl. Madras 1:369 (260).

Perennial climber; young parts pubescent. Leaf stipulate, petiolate, trifoliolate; petiole 1-3 cm; stipules triangular. Leaflets ovate, lateral ones oblique, velvety hairy; veins prominent below. Flower in short axillary few flowered (1 or 2) clusters, shortly peduncled. Calyx teeth equal. Corolla yellow, standard 0.8 to 1 cm, remaining for considerable time, but not quite until the pods ripened. Stamens 10, diadelphous. Ovary densely hairy; pod velvety pubescent, rounded at both ends, with small styler point. Seeds 3-5, brown at maturity, with large double, fleshy stropheole.

**Flrs. & Frts. :-** Sept. - Dec.

**Locality :-** Frequent throughout Dhargad area and Narnala.

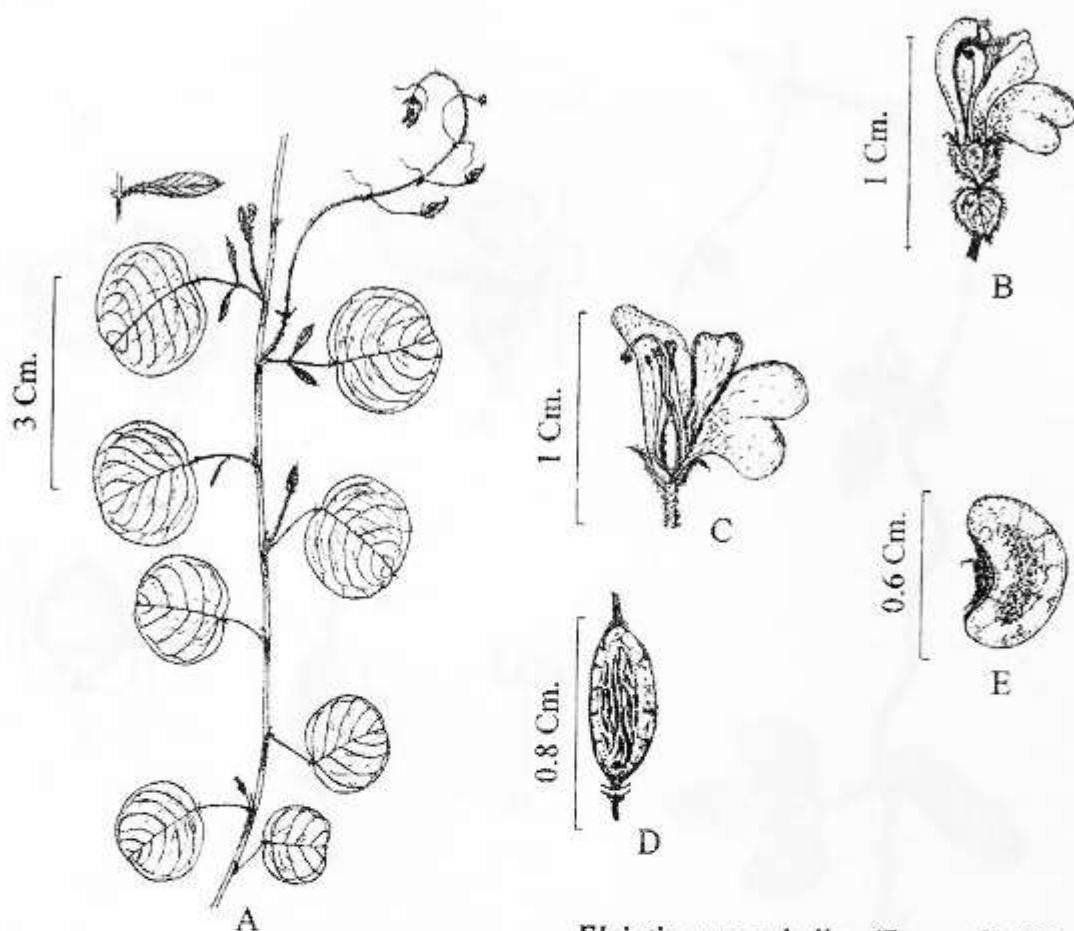
**Exsiccata :-** PYB. 280

Smell and taste of seeds exactly like that of Tur (*Cajanus cajan*). **First record for Maharashtra.**



# FABACEAE

*Eleiotis monophylla* (Burm .f.) DC.



A - Habit sketch, B - Single flower,,  
C - L.S. flower, D - Fruit, E - Seed..

*Eleiotis monophylla* (Burm .f.) DC. Mem.  
Legum. 7 : 350. 1825; Raizada in Ind. For 92 :309  
1966; *Eleiotis sororia* DC.Cooke Fl. Pre . Bomb.  
1; 364.

Trailing annual herbs, glabrous except at flowering axes and young parts, young parts thickly glandular hairy. Stems 30-50 cm. long, ribbed. Leaves tri or unifoliolate, stipulate; stipules scarious, 2-4 m.m. long. ovate-lanceolate, acuminate. Petioles 1.5-2 cm long, hairy. Leaflets stipellate; terminal leaflet orbicular, 1.5-4 x 1.5-4.5 cm., emarginate, cordate at base; lateral leaflets linear-lanceolate, 0.5-1 x 1-0.3 cm, cuneate at base, falling off in older leaves; lamina glabrous above, glandular hairy on veins beneath. Inflorescence few flowered axillary raceme; peduncles filiform, elongating much in fruiting stage, hairy. Calyx 1mm. long, teeth short, rounded, pubescent. Corolla pink-orange, standard 0.7-0.8 cm., shallowly bilobed. stamens 10, diadelphous, anthers uniform. ovary subsessile; pod 5-6 mm. long, single seeded, glabrous, flat, blotched with brown streaks.

**Flrs. & Frts. :-** Aug. - Nov.

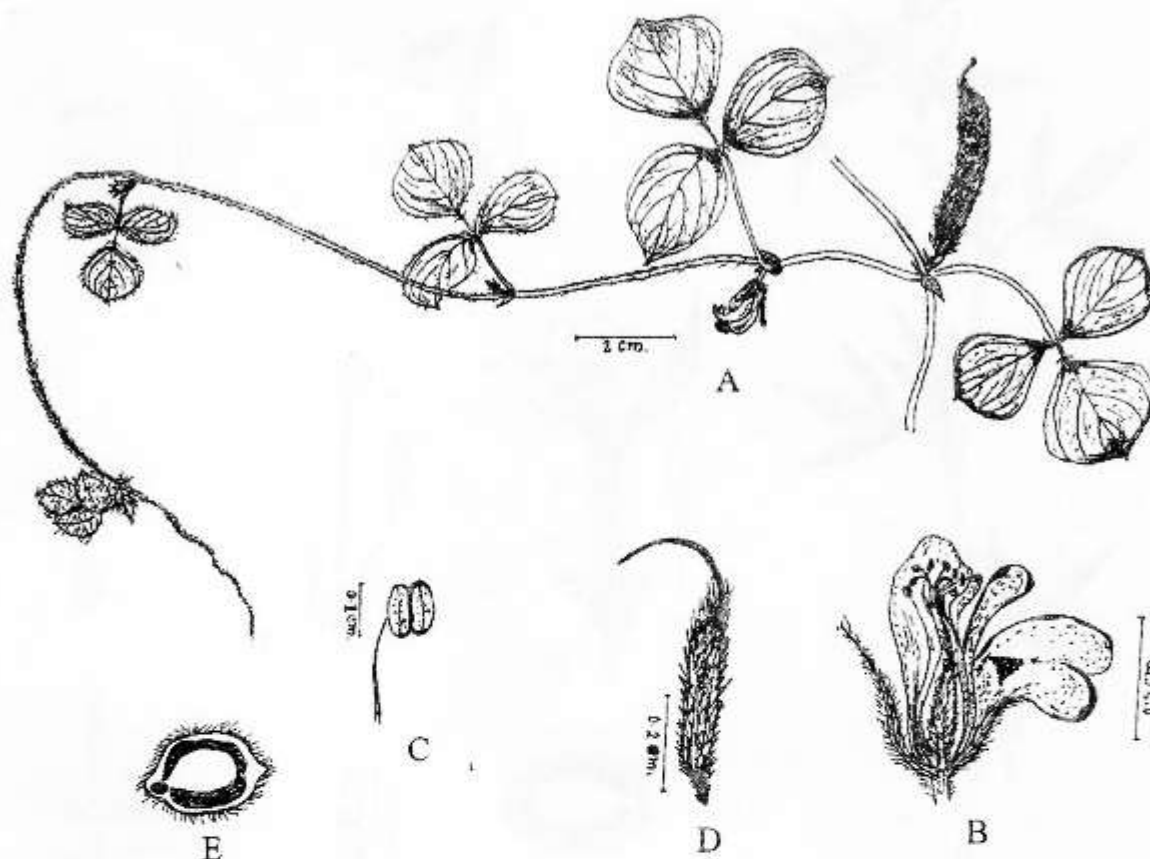
**Locality :-** Narnala fort, Gullarghat MPCA area.

**Exsiccata :-** VDD. & PYB 283

Rare plant. The species has been reported by M.A. Dhore also but the populations described are with single leaflet. It is because of the lateral leaflets which were reported by Linnaeus, that the species was founded on the basis of this character by De Candolle . Present population differs from *E. monophylla* described by Kamble and Pradhan in being not mottled with yellow-brown spots. All Legumes are basicall woody and with pinnate compound leaf. From pinnate compound three foliolate and from that unifoliolate condition resulted. Year 1998 was of exceptional rains. These most favourable conditions resulted in producing ancestral character ie. three foliolate leaf.

# FABACEAE

*Macrotyloma uniflorum* (Lam.) Verdc.



A - Habit sketch, B - L.S. flower,  
C - Single stamen, D - Gynoecium, E - T. S. Ovary.

*Macrotyloma uniflorum* (Lam.) Verdc. in Kew Bull. 24:322, 401. 1970 & in Hook. Ic. Pl. 38:37. 1982. *Dolichos uniflorus* Lam, Encycl. 2:299. 1786. *D. biflorus* auct. non. L. 1753; Baker in Hook. Fl. B. I. 2:210. 1876; Cooke. Fl. Pres, Bombay 1:407. 1958 (Repr. ed.)

Delicate climbers. Hairy when young. Leaves trifoliolate, stipulate; stipules fixed at base, small, ovate; stipels filiform. Leaflets 1.5-4 x 1-3.5 cm, rhomboid, obovate; apex acute, hairy on both surfaces. Flowers solitary, axillary or two, white or pale cream. Calyx unequal in length, 0.3-0.7 cm long, thickly hairy. Corolla creamish; standard with purple triangular spot; wings narrow, linear, slightly expanded at base; keel larger than wings. Stamens diadelphous; anthers 1 mm long, dorsifixed. Ovary thickly pubescent, 5-6 mm long; style curved; stigma simple. Pod flattened, hairy; hairs, soft silky, 3-4 cm long; seeds 4-6, smooth, slightly compressed.

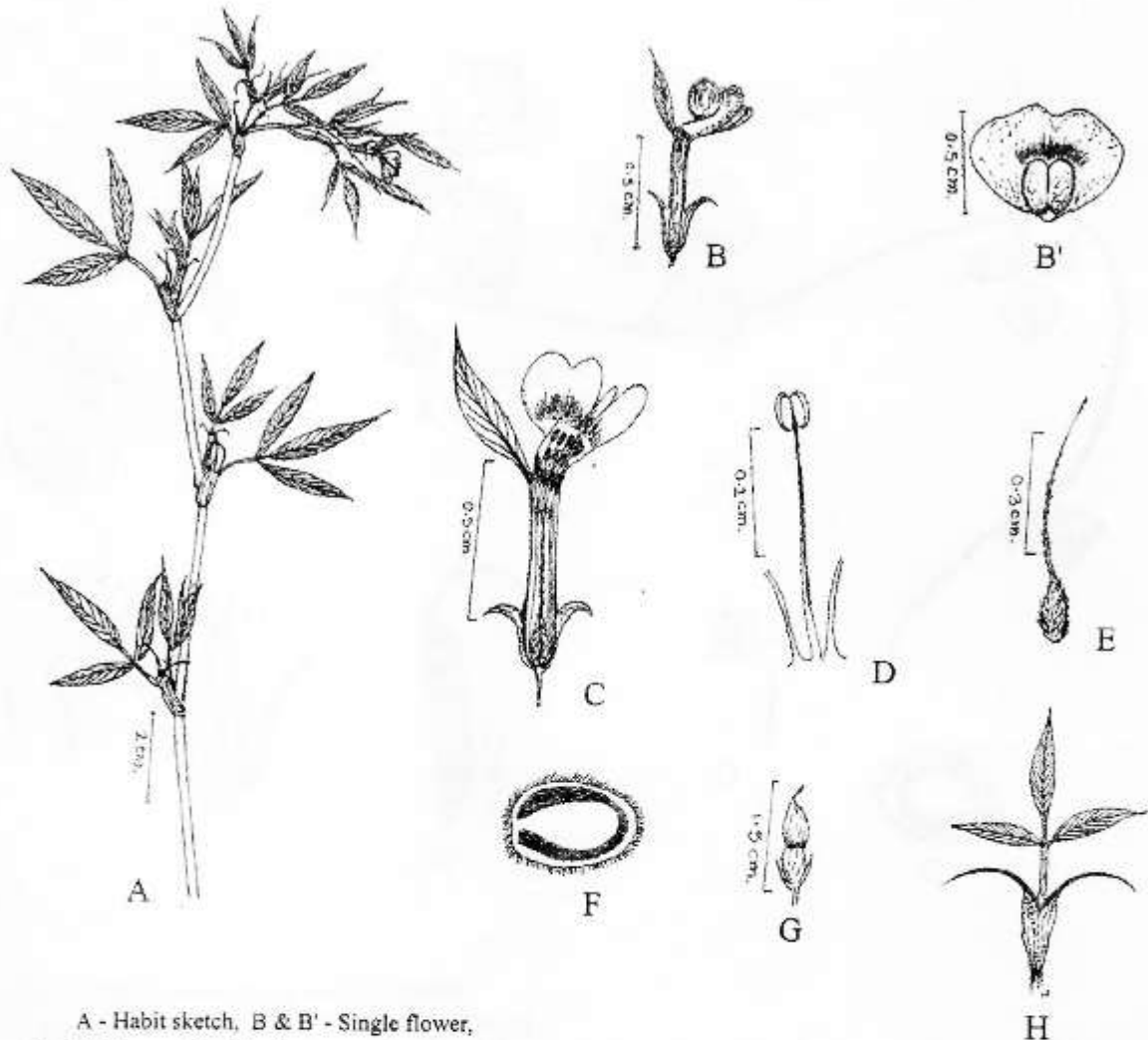
**Flrs. & Frts.** :- Sept. - Nov.

**Locality** :- Narnala fort. Uncommon.

**Exsiccata** :- PYB. 284.

In vernacular known as Kulith and cultivated in tribal areas throughout Maharashtra. However in Melghat it is not under cultivation.

**FABACEAE**  
*Stylosanthes fruticosa* (Retz). Alston.



A - Habit sketch, B & B' - Single flower,  
 C- L.S. flower, D - Single stamen, E - Gynoecium,  
 F - T. S. Ovary, G - Pod, H - Stipulate leaf

*Stylosanthes fruticosa* (Retz). Alston V.N.  
 Naik. Fl. Marathwada 1:301 1998 *Stylosanthes*  
*mucronata* Willd. Hook Fl.B.I.2:148.

Herbs. Branches stiff ascending, glabrous. Leaves pinnately trifoliate, petiolate, stipulate; stipules membranous, adnate to petiole for half of the length, tips green, free, narrow, leaflets lanceolate, acute, strongly nerved and gland dotted beneath. Inflorescence terminal, a close spike. Flowers small, yellow 1-3, enclosed by leafy bracts. Calyx tubular, tube filiform; lobes membranous, 4, connate and ciliate at apex, lower narrow, 2mm long. Standard orbicular with brown spot; wings oblong, free; keel incurved. Stamens monadelphous, anthers dimorphic. Ovary subsessile, pubescent. Pod short, concealed by persistent bracts, beaked, 2 seeded, thinly pubescent.

**Fls. & Frts. :-** Aug. - Jan.

**Locality :-** Harisal. Also found in plains

**Exsiccata :-** VDD. 2.

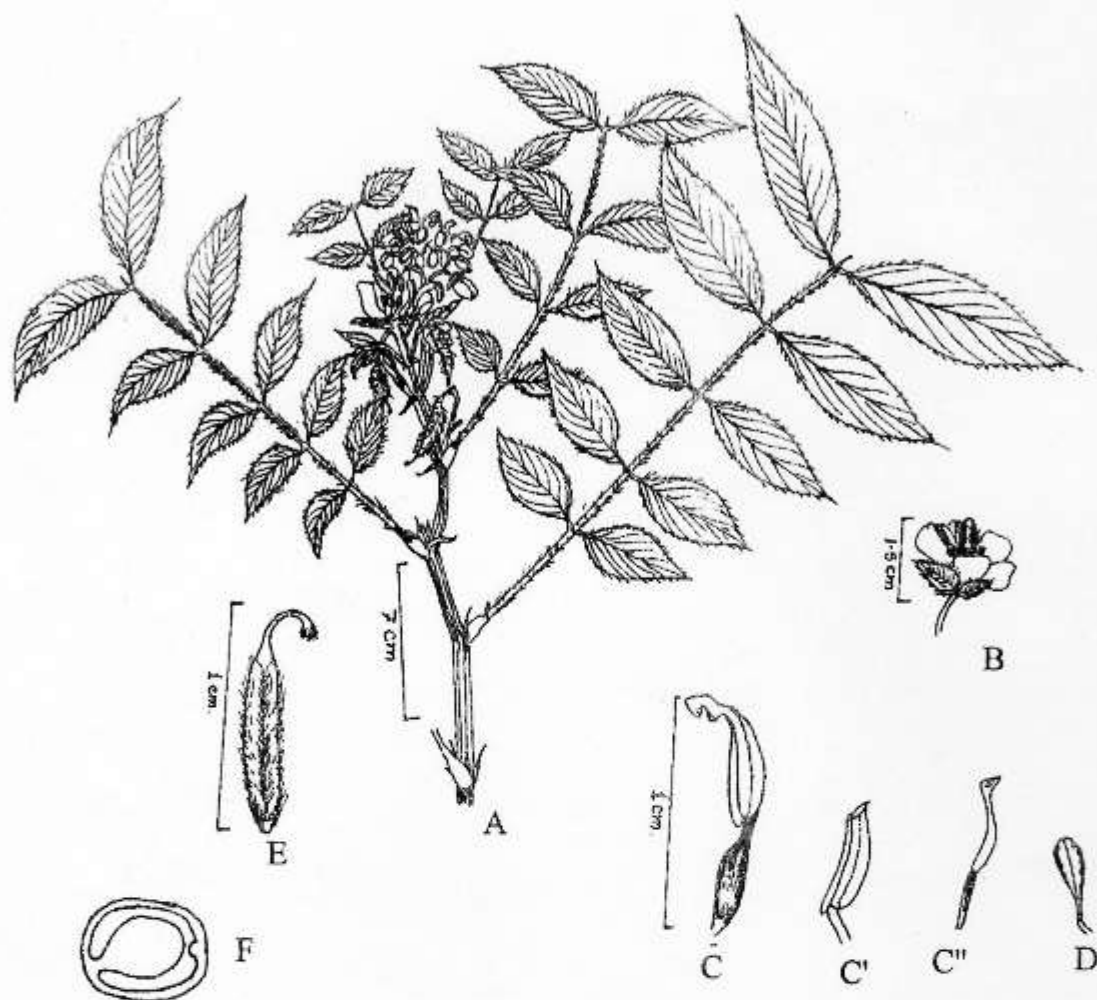
The plant was introduced as fodder, but was not successful. Few are growing as escapes. Hooker describes the species as undershrub, but was found to grow not more than few inches in Melghat.



*Sesbania bispinosa* (Jacq.) Steud. ex. Wight. The species is characterised by yellow corolla with black spots on the back. On Narnala Fort along lake margin population without black spots and uniformly bright - yellow corolla was observed. Spines on stem and rachis not prominent. This population appears to be an intermediate between *Sesbania bispinosa* (Jacq.) Steud. ex. Wight. and *Sesbania cannabina* (Retz.) Pers.

# CAESALPINIACEAE

*Cassia hirsuta* Linn.



A - Habit sketch, B - Single flower, C, C', C'' - Stamens,  
D - Staminode, E - Gynoecium, F - T. S. Ovary.

*Cassia hirsuta* Linn. Hook. Fl.B.I.2:263, T. Pullaiah and E.Chennaiah. Flora of Andhra Pradesh v.1:337. Gamble Fl. of Madras 1:401.1919.

Diffuse undershrubs; 5-7 ft. high, softly villous; stems strongly ribbed. Leaf evenly unipinnate, 15-20 cm. long; leaflets in 4-5 pairs, uppermost pair largest, 11x4 cm; lowest smallest, 5x3 cm; stipules narrow, ciliate; base pulvinous; nectary present above the pulvinous; petiole grooved; rachis extending beyond leaflets in the form of appendage. Inflorescence few-flowered axillary raceme condensed into a cluster. Flower large 2.5-3 cm. across, yellow. Calyx 5, unequal, densely villous, greenish brown. Corolla yellow, largest petal distinctly bilobed. Fertile stamens 6; 2 longer with produced, hooked connective and dilated filament; 4 shorter without produced connective and simple filament; 4 staminodes. Ovary densely hairy; style short, curved; stigma capitate, pod pubescent, slender, flattened, many seeded.

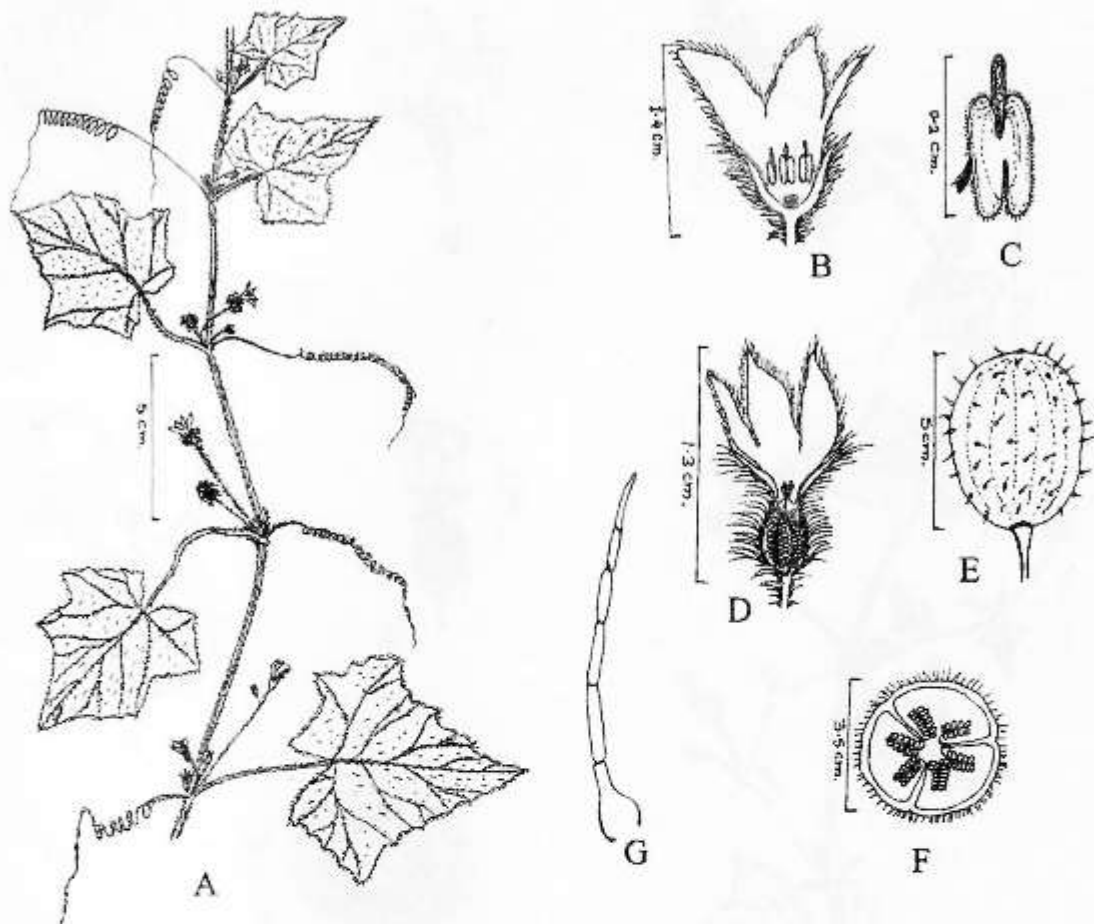
**Flrs. & Frts.** :- June - Dec.

**Locality** :- Semadoh.

**Exsiccata** :- PYB. 338

Not common. First record of Maharashtra.

**CUCURBITACEAE**  
*Cucumis prophetarum* Linn.



A - Habit sketch, B - L.S. Male flower,  
 C - Single stamen, D - L.S. Female flower,  
 E - Fruit, F - T.S. Ovary, G - Hair.

*Cucumis prophetarum* Linn. Cent. Amoen.  
 Academ. v. 4 (1759) p. 295. Hook. Fl. B. I. 2 :  
 619; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p.  
 640.

Monoecious, perennial climbers. Stems scabrid, branched, angled and grooved. Tendrils axillary, simple. Leaves palmate, deeply cordate at base, 3 - 5 cm. long and broad, scabrid, hairy on the nerves beneath; petioles 1 - 3 cm. long, hairy. Male flowers solitary; peduncles filiform, densely hairy, 0.5 - 0.7 cm. long. Calyx lobes 5, subcylindric; tube 4 - 5 mm. long; teeth linear, 3 mm. long, densely hairy. Corolla yellow 3 - 5 mm. long, lobes ovate - oblong, subacute, hairy. Stamens 3, free; filaments short, slightly hairy; anthers oblong; connective produced beyond the anther cells. Female flowers solitary; calyx & corolla as in male. Ovary globose, hairy; hairs bulbous based, spiny at maturity; ovules many, horizontal; style short; stigmas 3, obtuse. Fruit globose, 2.5 - 5 cm. long and broad, longitudinally striped with green and white, echinate; seeds ellipsoid.

**Flrs. & Frts. :-** July - Sept.

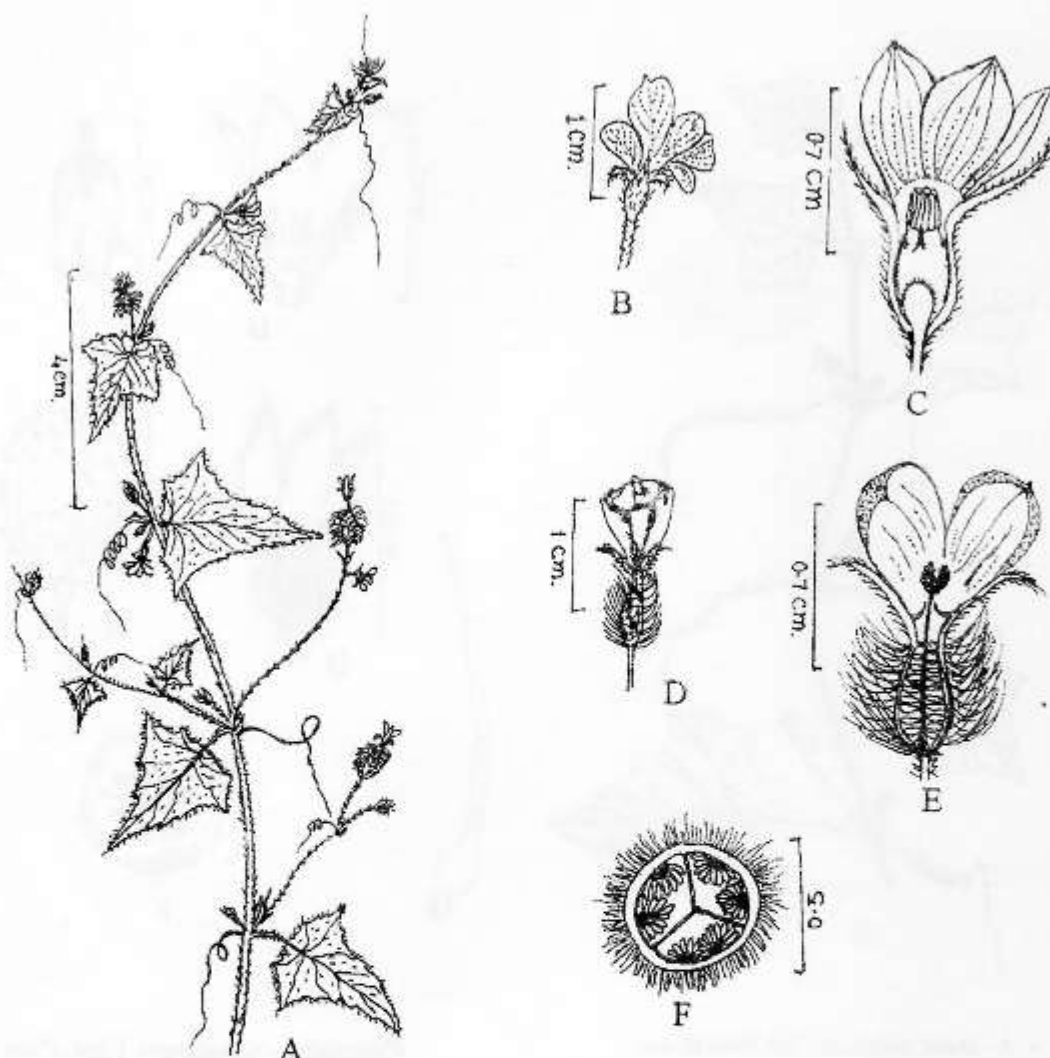
**Locality :-** Semadoh, Masoondi, Gullarghat.

**Exsiccata :-** VDD. 215.

First record for Maharashtra. Cooke (1967) in his flora of Bombay Presidency describes the species from Sind.



CUCURBITACEAE  
*Cucumis setosus* Cogn.



A - Habit sketch, B - male flower, C - L.S. Male flower,  
 D - Female flower, E - L.S. Female flower, F - T.S. Ovary,

*Cucumis setosus* Cogn. in DC. Monog. 3 : 491. 1881; Chakravarty in Rec. Bot. Surv. India 17 : 106. 1959 & in Fasc. Fl. India 11.38.1982 ; Jefferey in Kew Bull. 34 : 794. 1980.

Annual climber, tendrils simple; stems covered by rough, scabrid spreading hairs. Leaves 5.5 x 7 cm, ovate - triangular, undivided or slightly trilobed, hairy more so on upper surface; on lower surface, hairs are confined to veins. Petioles 6 cm long. Male & female inflorescences separate ; males in axillary clusters, pedicellate; pedicels filiform and delicate 1/2 cm long; hairy. Calyx teeth narrow, brownish hairy. Petals free for 3/4 of the length; stamens, almost united with the petals at base; connective produced. Female flowers axillary, solitary; ovary thickly hairy; hairs stiff, 0.5 - 0.6 cm long, brownish ; style long; stigma trifid, papillate. Fruit ellipsoid, covered by stiff brown hairs; striped; stripes 10 or more, ovules many in each locule, arranged horizontally.

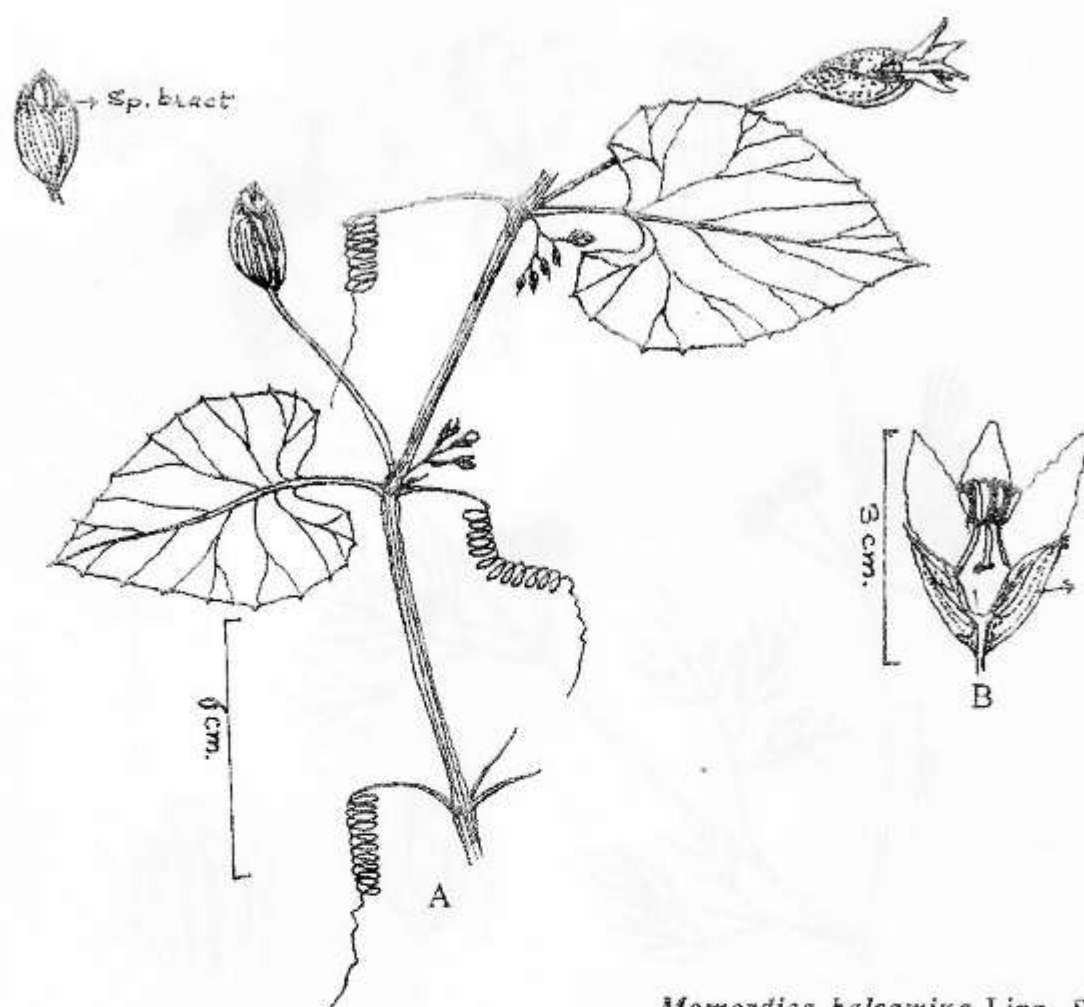
Flrs. & Frts. :- Aug. - Sept.

Locality :- Masoondi.

Exsiccata :- PYB. 210

First record for Vidarbha.

**CUCURBITACEAE**  
*Momordica balsamina* Linn.



A - Habit sketch, B - L.S. Male flower.

*Momordica balsamina* Linn. Sp. Pl. (11.7.53) p. 1009. Hook. fl. B. I. V. 2, p. 617; Aitch. Pb. & Sind Pl. P. 63; Hook F. in Oliver. Fl. Trop. Afr. V.2, 537; Woodr. in Journ Bomb. Nat. V. 11. (1898) p. 640; Watt, Dict, Econ. Prod. V. 5 : 256.

Slender, small, tuberous climbers growing to 5 - 7 feet; glabrous; tendrils simple. Leaf membranous, orbicular, cordate at base, palmately lobed. Plants monoecious. Male flowers solitary; peduncle 2-3 in. long with wide orbicular spatheaceous bract present at the apex. Calyx lobes acute with slender mucrona. Sepals 5, 0.8 x 4 cm, free up to the base; hairy, acute, mucronate, Corolla; petals 5, free, yellow, 2 by 0.7 - 0.8 cm. Stamens 3, inserted on the corolla tube, one 1 - celled and other two, 2 - celled; anthers cohering to each other; filaments free. Female flowers and fruits not seen.

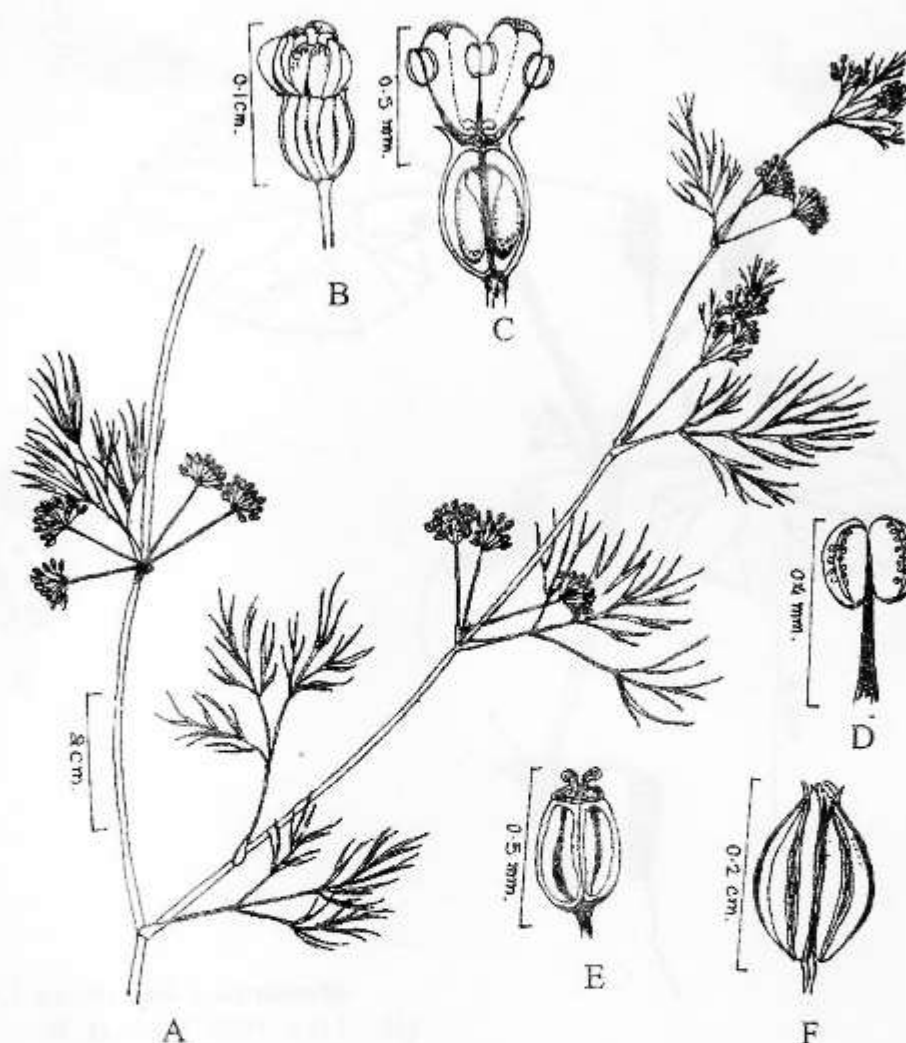
**Flrs. & Frts. :-** Oct. - Nov.

**Locality :-** Plant has been collected along the interior road from Chikhaldara to Kolkaz. Some plants were found growing at Vairat.

**Exsiccata :-** VDD. 201.

Rare. Cooke (1903) notes it to be common in Sind, occurring in Gujrat & rare in Deccan. After Cooke there is no report of the species from Maharashtra.

**APIACEAE**  
*Apium graveolens* Linn.



A - Habit sketch, B - Single flower, C - L.S. flower,  
D - Single stamen, E - Gynoecium, F - Fruit

*Apium graveolens* Linn. Hook. Fl. B. I. 2:  
679.

Glabrous herbs 20 - 30 cm. Leaves decompound, segments filamentous; base sheathing, sheath broad with membranous margins, ciliate; cilia short. Umbels compound, branches usually 3, sometimes 4, all arising from the same point; opposite the leaf; primary peduncles absent. Bracts and bracteoles absent. Petals faint pink, entire, tip inflexed. Stamens five, almost equaling the petals. Stylopodium not distinct, styles 2, short; stigmas curved back. Fruit elliptic - orbicular, laterally subcompressed; primary ridges prominent, secondary absent, single vitta in each furrow.

**Flrs. & Frts. :-** July. - Sept.

**Locality :-** In interior forest along moist shady slopes.

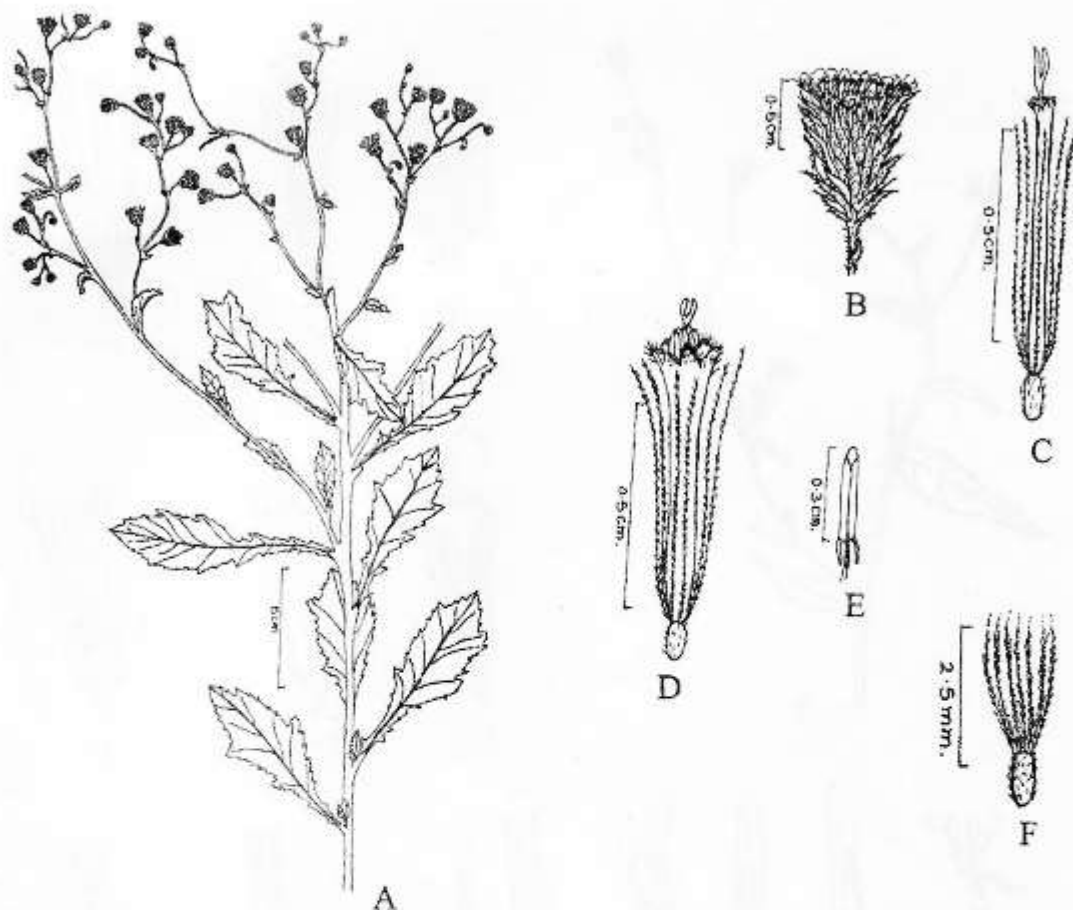
**Exsiccata :-** PYB. 150

Rare species. The genus is represented by single species in India, distributed over the base of North - West Himalayas and outlying hills in Punjab. Outside this area it occurs only in Melghat. However the species unlike its name has no strong aroma.



# ASTERACEAE.

## *Blumea jacquemontii* Hook.



A - Habit sketch, B - Capitulum, C - Ray floret,  
D - Disc floret, E - Single stamen, F - Achene.

*Blumea jacquemontii* Hook. Fl.B.I.3:265;  
Naik & Bhogaonkar Bip Acta Botanica Indica 20  
: 45-49. 1992. *B. membranacea* var. *jacquemontii*  
(Hook. f.) Randeria, *Blumea* 10 : 271. 1960.

Erect, stout herbs often woody below, 1-2 m tall, perennating by means of root stalk; branches rough, hairy. Leaves oblanceolate, 5 - 12 x 2-5 cm, lower petioled, deeply lobed or lyrate; upper sessile, lanceolate, all deeply toothed, more or less glabrous. Heads reddish yellow, campanulate, 8- 12 mm across, solitary or subclustered on long slender peduncles in lax panicles. Receptacle glabrous or pillose, pitted; pits areolate. Involucral bracts 4-5 seriate, faint or deep purple, linear, the outer ones ovate, 2mm long and spreading or recurved, densely pubescent, without membranous margins; inner ones gradually longer, more scarious and glabrous; marginal florets filiform, tubular; disc florets tubular, broader, 5-fid corolla; corolla lobes pubescent. Ovaries oblong, pubescent; style smooth; stigma spatulate with papillate margins. Pappus bristles 5 - 10, scabrid, as long as corolla. Achenes ribbed, densely pubescent, with a ring of minute hairs at the top.

**Flrs. & Frts.** :- Dec - Feb.

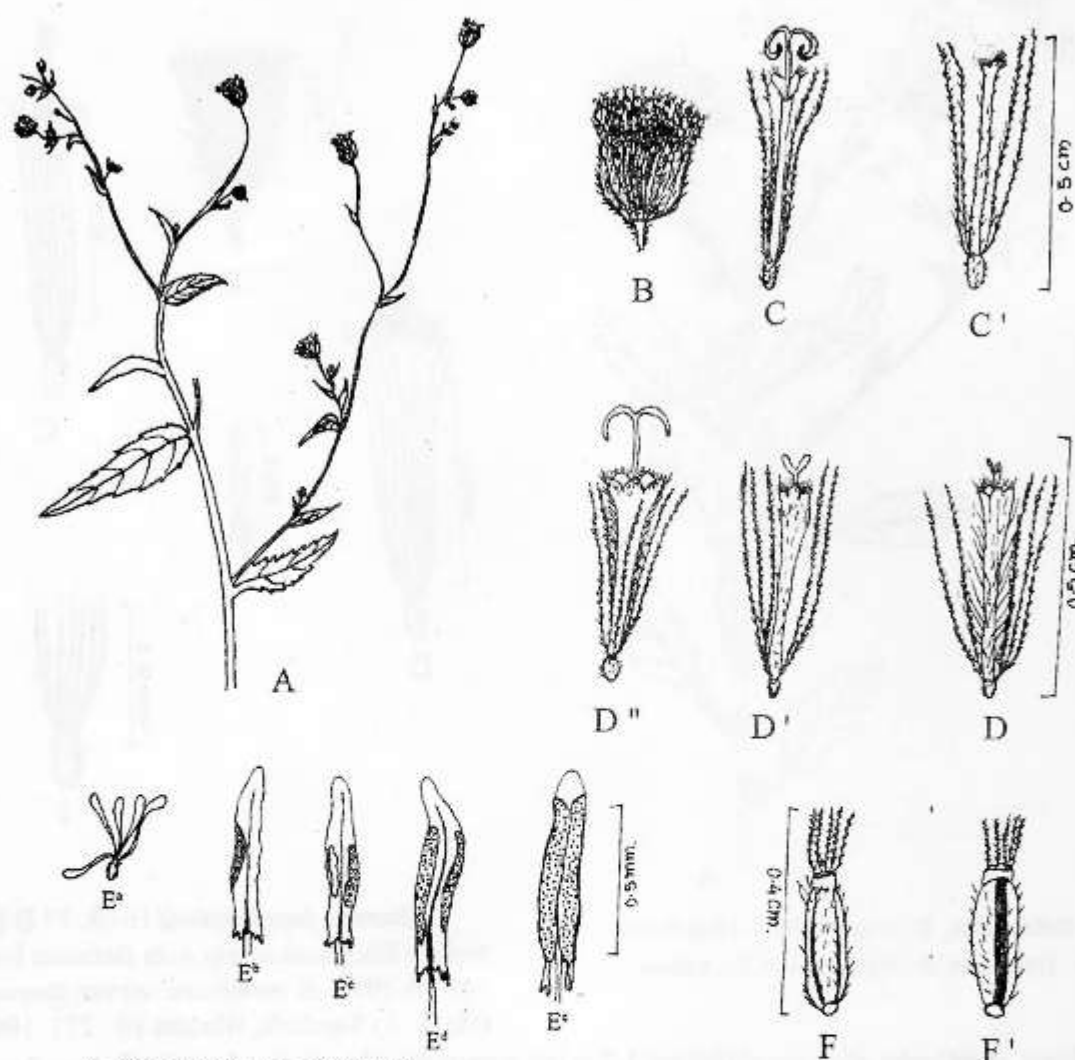
**Locality** :- Chikhaldara, Dharni ghat.

**Exsiccata** :- PYB 13 (a), PYB 13 (b).

Very similar to *B. virens*. DC. but much stouter and with profuse branching from base. Hairs comparatively thicker; inflorescences larger; bracts purple and flowers reddish yellow turning orange at maturity; styles bright orange. Should stand as a distinct species. (Naik & Bhogaonkar, 1992)

# ASTERACEAE

*Blumea oxyodonta* DC. var. *erecta* Naik et Zate.



A - Habit sketch, B - Capitulum,  
C & C' - Ray florets, D, D' & D'' - Disc florets,  
E\* - E\* - Staminode to Fertile anther stage, F & F' - Achenes

*Blumea oxyodonta* DC. var. *erecta* Naik et Zate.

Small procumbent or erect herbs, densely tomentose. Leaves sessile, ovate, dentate; dents irregularly small and large, spinous. Inflorescence terminal paniculate cymes; peduncles long. Marginal florets filamentous, hairy; disc florets, tubular, hairy. Pappus as long or longer than the florets. Androecial condition shows marked variation. Ovaries pubescent. Achenes usually not formed.

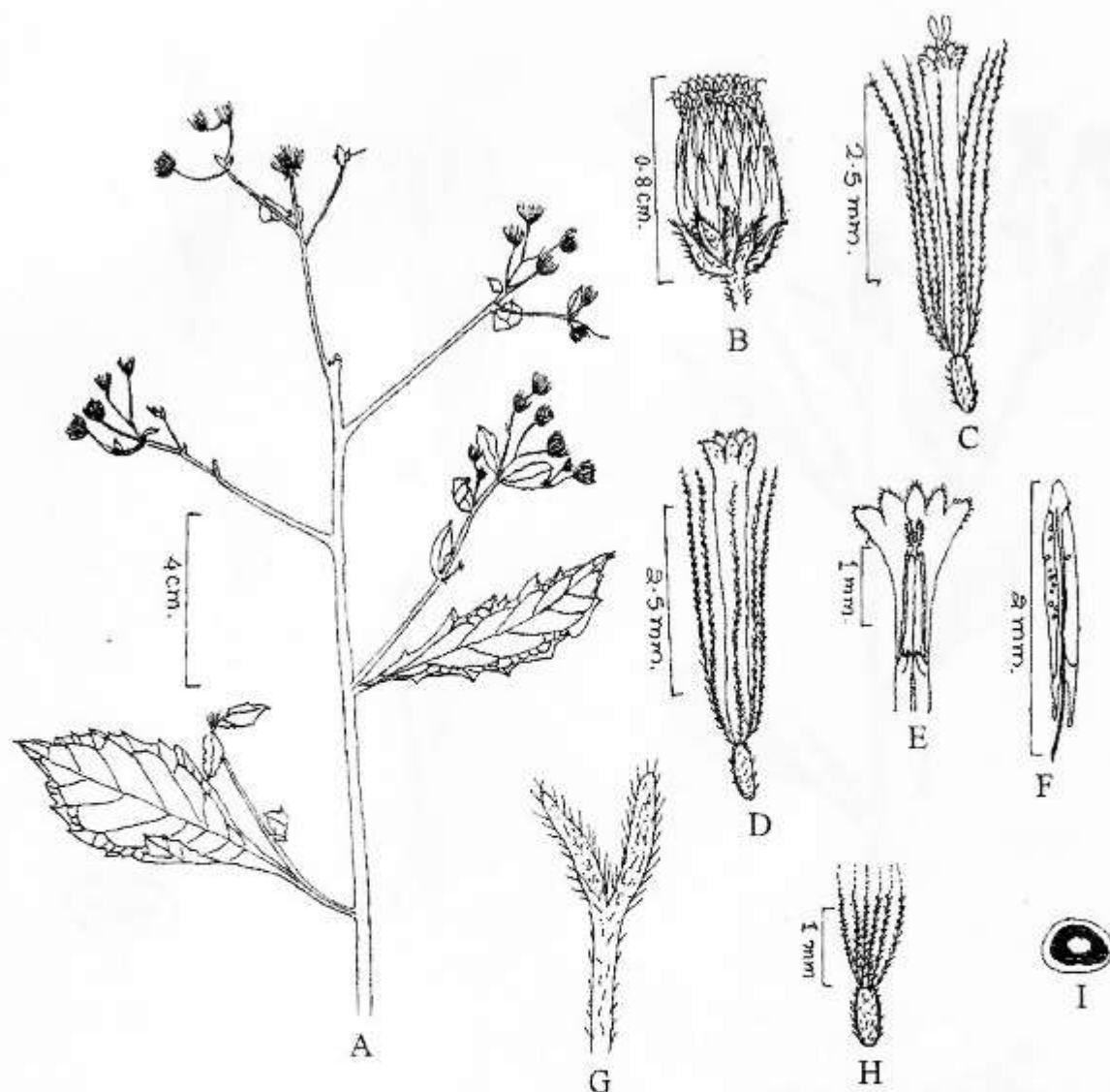
**Flrs. & Frts. :-** Nov. - Mar.

**Locality :-** Chikhaldara.

**Exsiccata :-** PYB. 8 (c).

Much similar to *B. oxyodonta* prostrate forms. Stamens in prostrate forms are either empty in the form of club shaped staminodes. In erect forms anthers developed varrious degrees of male fertility (Fig. E\* - E\*) with increased fertility characteristic anther tails develop and along with male fertility tubular floret also become larger; styles more prominent, exerted and stigmatic arms long curved. Some of the erect populations observed in Maharashtra become 3 ft or so high and produced normal achenes. Obviously this is an example of apomictic species becoming sexual to progress along the evolutionary line.

ASTERACEAE  
*Blumea virens* DC.



A - Habit sketch, B - Capitulum, C - Ray floret,  
D - Disc. floret, E - Corolla split open with stamens,  
F - Single stamen, G - Stigma, H - Achene, I - T.S. Ovary

*Blumea virens* DC. in wt. Contr. 14. 1834.  
Fl.B.I.3:264. Randeria 10 : 272.

Erect branched, glabrous herbs, 30 - 40 cms. tall. Leaves elliptic oblong or oblanceolate, 1.5 - 10 x 0.5-3 cm., glabrous at maturity, dentate. Inflorescence terminal, paniculate cyme; heads yellow. Involucral bracts 3 - 4 seriate; outer green, inner scarious. Marginal florets filiform, tube 3 - fid; disc florets tubular, five lobed, glabrous, pappus as long as corolla. Ovary pubescent. Achenes ribbed, hairy.

**Flrs. & Frts. :-** Nov. - Feb.

**Locality :-** Dhargad.

**Exsiccata :-** PYB. 10 (a)

Species is much similar to *B. membranacea* DC. However the heads are broader than *B. membranacea* and receptacular pits with entire margins against the fimbriate ones in *B. membranacea*.



# ASTERACEAE

## *Centrantherum phyllolaenum* Benth.



A - Habit sketch, B - Single Flower,  
C - L.S. Flower, D - Single stamen,  
E - Gynoeceium, F - Achene, G - T. S. Ovary,

*Centrantherum phyllolaenum* Benth.ex.  
Hook. Fl.B.I.3 : 228; C.B. Clarke, Comp. Ind. p.  
4; Woodr. in Journ. Bomb. Nat.v II (1898), p. 647.

An erect branched annual; stems rough with minute bristles. Leaves 2 - 6 by 1 - 3 in. elliptic, acuminate, irregularly serrate, clothed with short setae above, densely covered with white woolly tomentum beneath; base tapering into a petiole. Heads 1/2 - 7/8 in. diam., solitary, axillary & terminal; homogamous; florets all tubular, bisexual. Outer involucre bracts many, cordate - lanceolate, deflexed, white beneath; intermediate bracts shorter than the inner, variable, obtuse, acute or rounded, erect or recurved, the margin often ciliate; innermost bracts scarious, often purple, linear - oblong, acute. Pappus white, stiff, shorter than the corolla tube; corolla, violet purple. Achenes oblong, deeply 10 ribbed, glabrous.

Flrs. & Frts. :- Sept. - Nov.

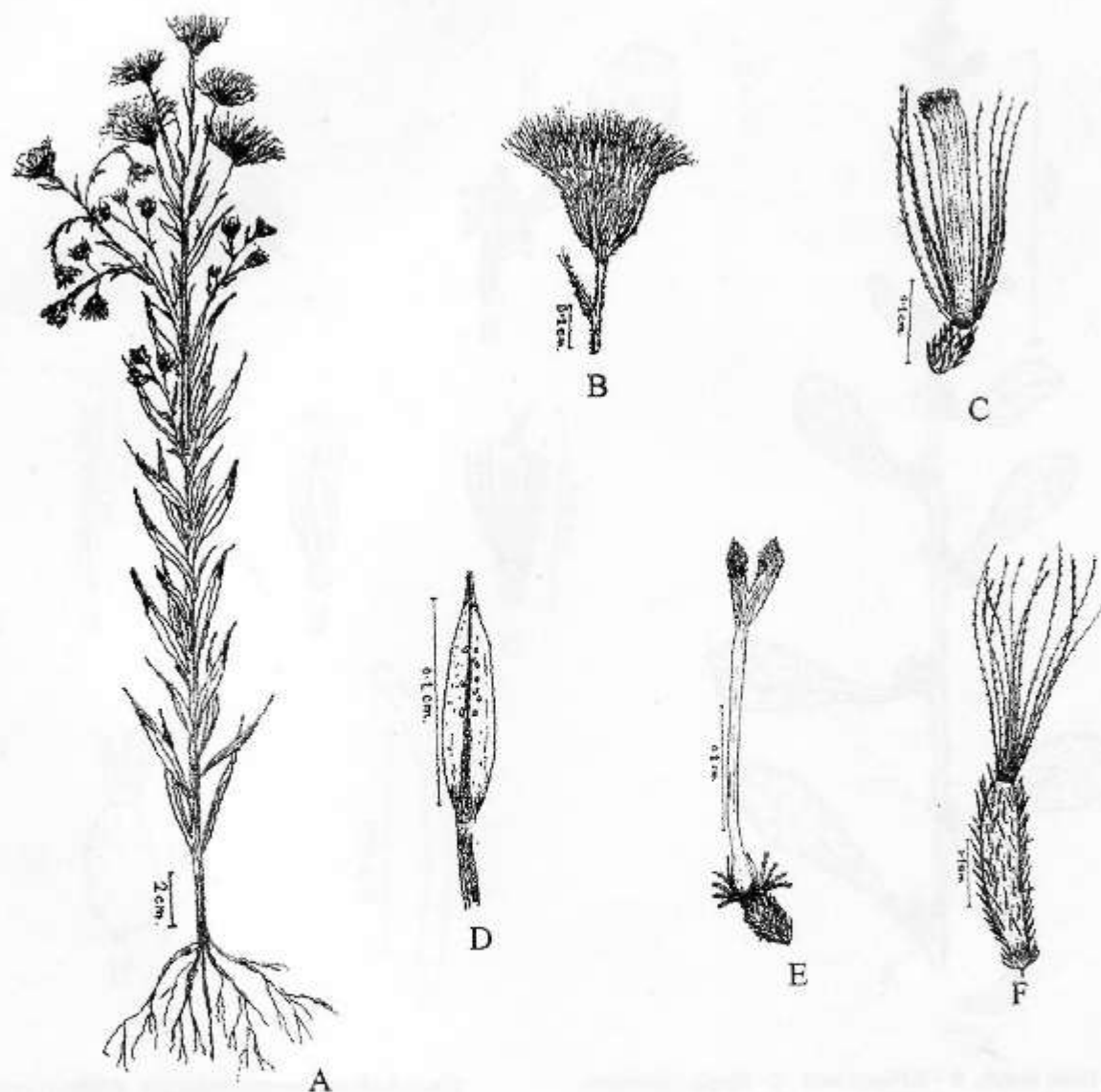
Locality :- Bhimkund, Chikhaldara.

Exsiccata :- PYB. 201.

Recorded from many other regions of Maharashtra earlier. First record for Vidarbha.

# ASTERACEAE

*Conyza canadensis* (L.) Cronquist.



A - Habit sketch, B - Capitulum,  
C - Single flower, D - Single stamen,  
E - Gynoecium, F - Achene.

*Conyza canadensis* (L.) Cronquist in Bull .  
Torr Bot. Cl. 70. p. 632 1943. *Erigeron canadensis*,  
L. sp. 863. 1753; Hook. Fl. B.I. 3: 245. Babu. Herb.  
Fl. Dehra Dun 263. 1977; Fl. Ind. Series 3. 1984.

Small tomentose, erect, herbs, 30 - 35 cms. tall. Leaves sessile, linear - lanceolate, margins entire or shallowly toothed. Heads white, homogamous, in terminal leafy panicles. Marginal florets, filamentous ; disc florets tubular, lobes with few glands. Anthers not tailed ; style swollen at base. Achenes brown, hairy.

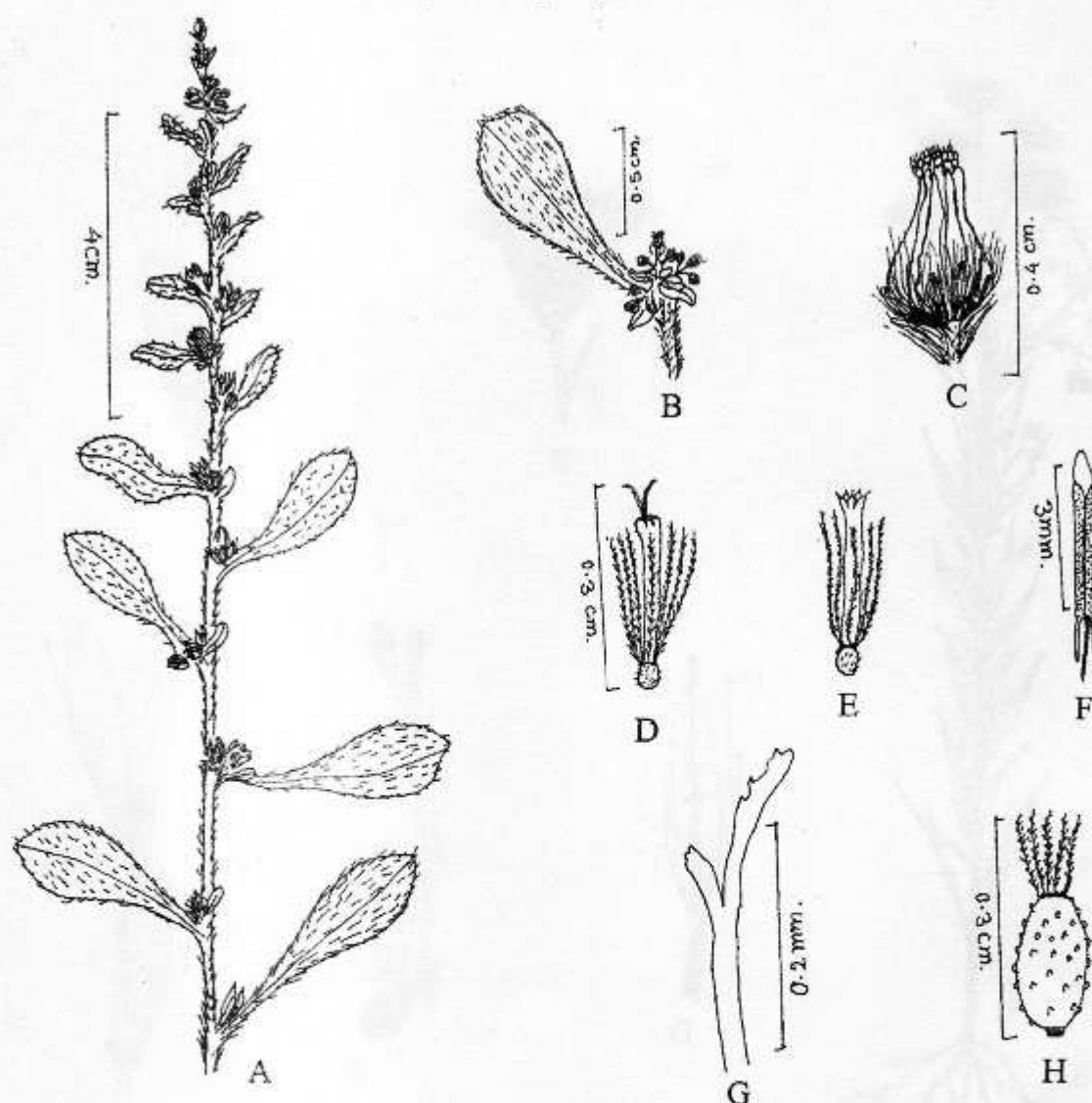
**Flrs. & Frts :-** Oct. - Dec.

**Locality :-** Collected only from higher plateau of Chikhaldara.

**Exsiccata :-** PYB. 211.

Never before reported from any of the regions of Maharashtra.

**ASTERACEAE**  
***Gnaphalium pensylvanicum* Willd.**



A - Habit sketch, B - Inflorescence C - Single Capitulum,  
D - Ray Floret, E - Disc. Floret, F - Single Stamen,  
G - Stigma, H - Achene.

***Gnaphalium pensylvanicum* Willd.** Enum. Hort. Berol. 867. 1809; Babu, Herb. Fl. Dehara Dun 269. 1977, *Gnaphalium purpureum* (auct. pl. non L. 1753); Hook. Fl. B. I. 3:289. 1881.

Erect or ascending herbs, 15 - 45 cm. tall, cottony tomentose. Leaves sessile, narrowly spatulate or oblanceolate, narrowing down into petiole like blade. Inflorescence a condensed spike in lower leaf axils, becoming spicate terminally on axis. Heads faint yellow with purple tinge, densely tomentose. Outer florets filiform; disc florets tubular, 5 - lobed, pappus bristles 15, united at base to form a ring. Ovary minutely papillate; style smooth; stigmatic arms unequal. Achenes elliptic oblong, minutely papillate.

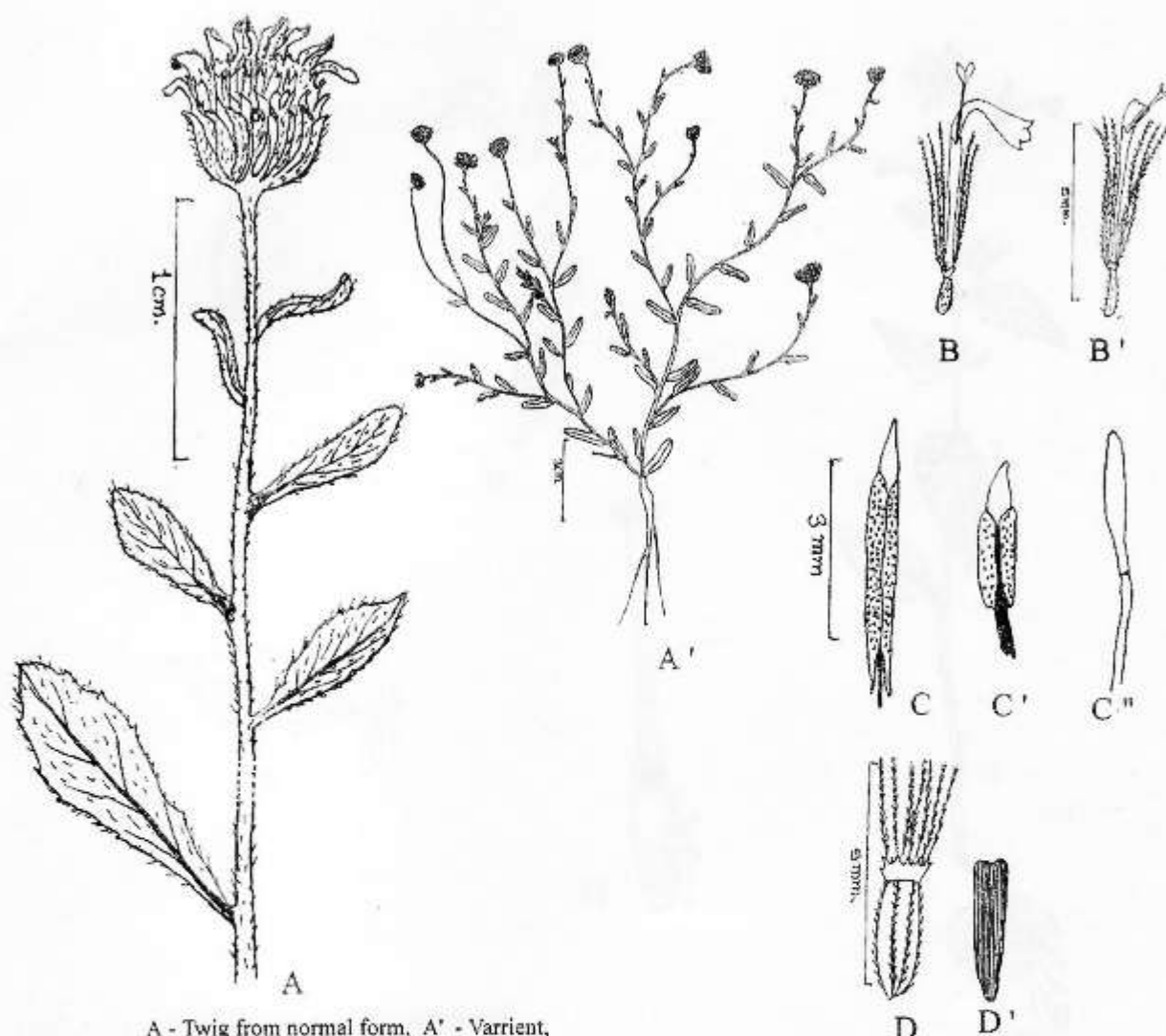
**Flrs. & Frts. :-** Dec. - Feb.

**Locality :-** Chikhaldara.

**Exsiccata :-** PYB. 18.

Very similar to *G. polycaulon* Pers, but distinguished from it by its taller, feebly branched habit, less cottony appearance, longer leaves and pappus bristles that are distinctly united at the very base.

**ASTERACEAE**  
*Pulicaria wightiana* (DC.) CL.



A - Twig from normal form, A' - Variant,  
B - Normal ray floret, B' - Ray floret from variant,  
C - Normal stamen, C' - Reduced stamen,  
C'' - Staminode from variant. D - Normal achene,  
D' - Parthenocarpic, woody acheneal structure from variant.

*Pulicaria wightiana* (DC.) CL. Comp. Ind.  
128.1786; Hook. Fl. B.I.3:298. C 2 : 90. *Poloa*  
*wightiana* DC. Arch. Bot. (Paris) 2 : 514. 1833.

Erect much branched small tomentose herbs. Leaves sessile, linear, oblong, obtuse, mucronate. Heads yellow, terminal, carried on long peduncle that widens below the receptacle. Involucre 3 - 4 seriate, outer bracts with scarious margins and lower 1/3 membranous part. Marginal florets female; disc florets bisexual.

**Flrs. & Frts. :-** Sept. - Mar.

**Locality :-** Narnala, Gavilgad,

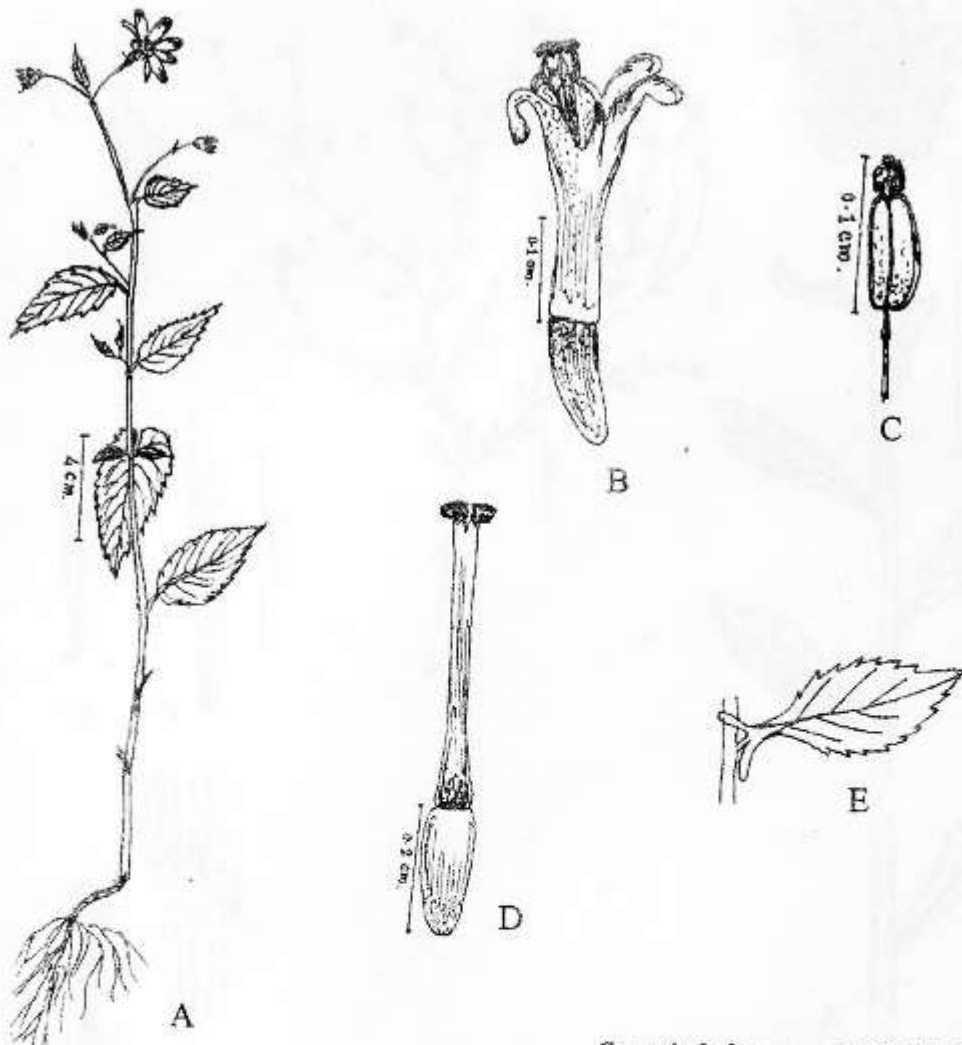
**Exsiccata :-** PYB. 28 (b).

The species is recorded by earlier authors also (Dhore, 1988.) However the present population is an remarkable variant with rays of the capitulum being lost. Instead marginal florets become filiform, obscurely bilabiate. Along with the loss of rays the sexuality of the head also changes. Tubular florets become narrower. Stamens develops male sterility, gynoecium also shows the signs of infertility. Along with this infertility of disc florets, marginal florets produced parthenocarpic fruits that are large, woody, acheneal structures. Either this is related to the ecology or more probably to the the absence of regular pollinators.



# ASTERACEAE

*Senecio belgumensis* C.B. Clarke.



A - Habit sketch, B - Single flower (Disc),  
C - Single stamen, D - Gynoecium,  
E - Auricled leaf base

*Senecio belgumensis* C.B. Clarke. Com. Ind (1876) p. 200 Hook. Fl. B. I. 3:348; Woodr. In Journ. Bomb. Nat. v 11 (1898) P. 650. *Madacarpus belgumensis*, Wight in Calc. Journ. Nat. Hist. v. 7 (1847) p. 157, Icon. t. 1152, Dalz & Gibs. p. 130.

Herbs 25 - 30 cm. tall. Stem ribbed, covered with cottony tomentum. Leaf petiolate, ovate, glabrous above and white tomentose below between the veins; veins prominent; base auricled. Heads solitary, axillary or terminal; peduncles with few scattered linear bracts; ligules few in number 7 - 8; styles of bisexual flowers truncate, pedicellate; pappus absent.

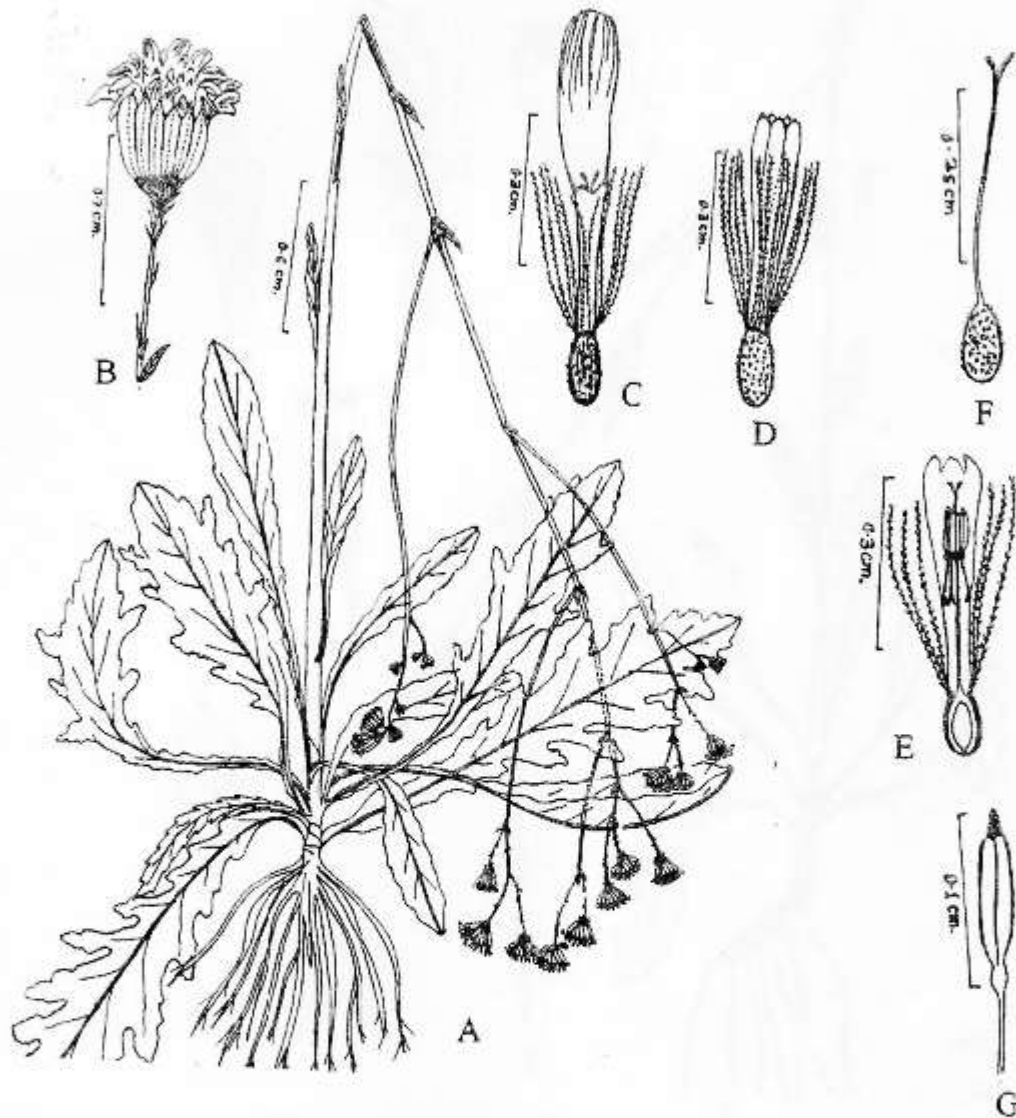
**Flrs. & Frts. :-** Aug. - Dec.

**Locality :-** Infrequent. Only at high elevations in Chikhaldara and Makhala. (950 m.). More frequent on Makhala plateau. Population at Makhala, without auricled leaf bases; plants collected at Chikhaldara mostly showed auricles.

**Exsiccata :-** VDD. 231.

The species is recorded for Mahabaleshwar, Purandar, Raigad and Savantwadi, Cooke, (1903). Presumed it to be apparently endemic to penninsular India. It looks much like that *S. grahami* differs in absence of pappus. Probably it was mistaken for *S. grahami* by earlier workers. A new record for Vidarbha region.

ASTERACEAE  
*Senecio chrysanthemoides* DC.



A - Habit sketch, B - Capitulum, C - Ray floret, D - Disc floret, E - L.S. Flower, F - Gynoecium, G - Single stamen.

*Senecio chrysanthemoides* DC. Hook.  
Fl. B. I. V. 3 : 339

Glabrous, scapigerous herbs. Stem 2-3 feet, robust, grooved. Lower leaves rosette, large, spatulate, deeply pinnately divided; lobes, dentate; midrib broad, dark purple; leaf purple on underside; cauline, leaves alternate. Heads in corymbose paniculate inflorescence, pedunculate; peduncles 7-10 cm. long. Ray florets yellow, 13-15, female. Disc florets tubular; pappus scabrid, shorter than corolla. Anthers short; filaments dialated below the anthers. Styles bifid, glabrous, narrow. Achenes not observed.

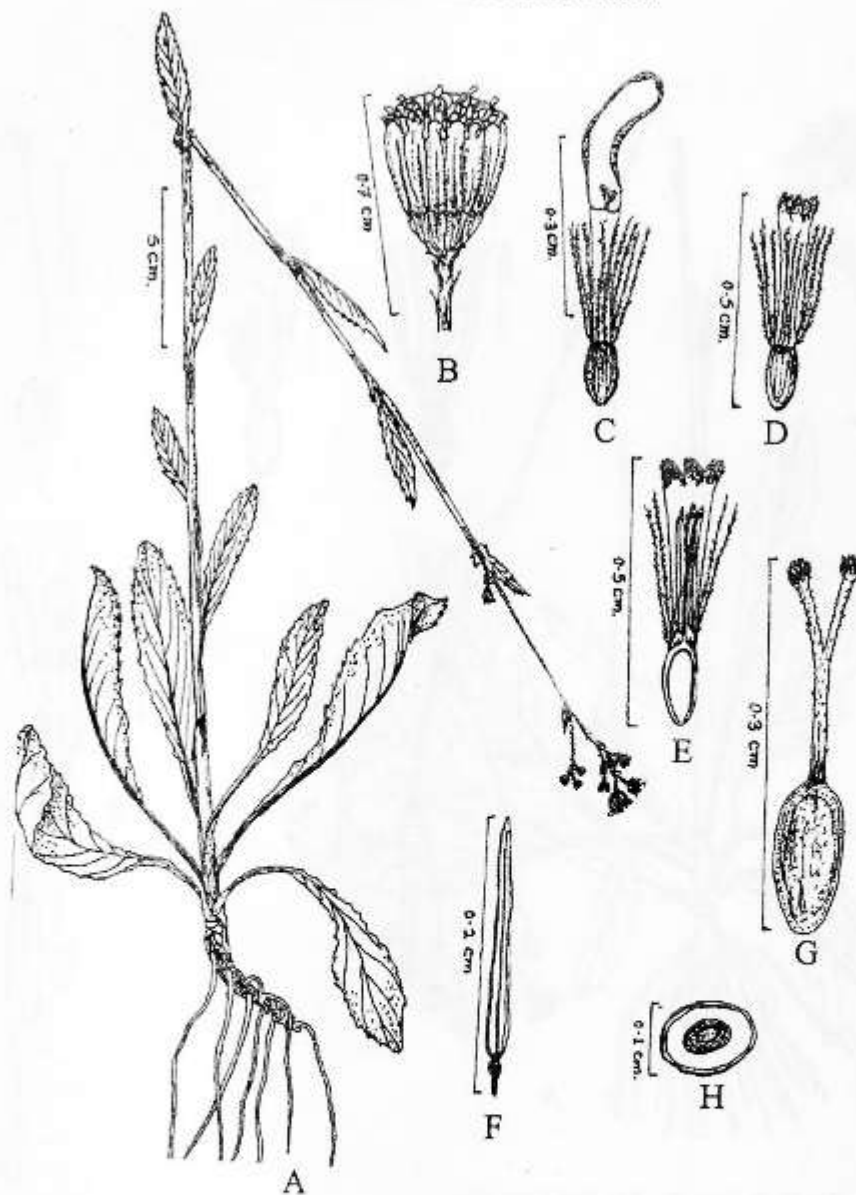
**Flrs. & Frts. :-** Dec. - Jan.

**Locality :-** On Vairat hills along moist slopes.

**Exsiccata :-** PYB. 246.

Rare. There is no record of this species from Maharashtra. Apparently in Himalayan species (Hooker, 1882).

**ASTERACEAE**  
*Senecio nudicaulis* Buch.



A - Habit sketch, B - Capitulum, C - Ray Floret,  
D - Disc Floret, E - L.S. Disc Floret, F - Single stamen,  
G - Gynoecium, H - T.S.Ovary

*Senecio nudicaulis* Buch. Ham : Hook  
Fl.B.I.3:340.

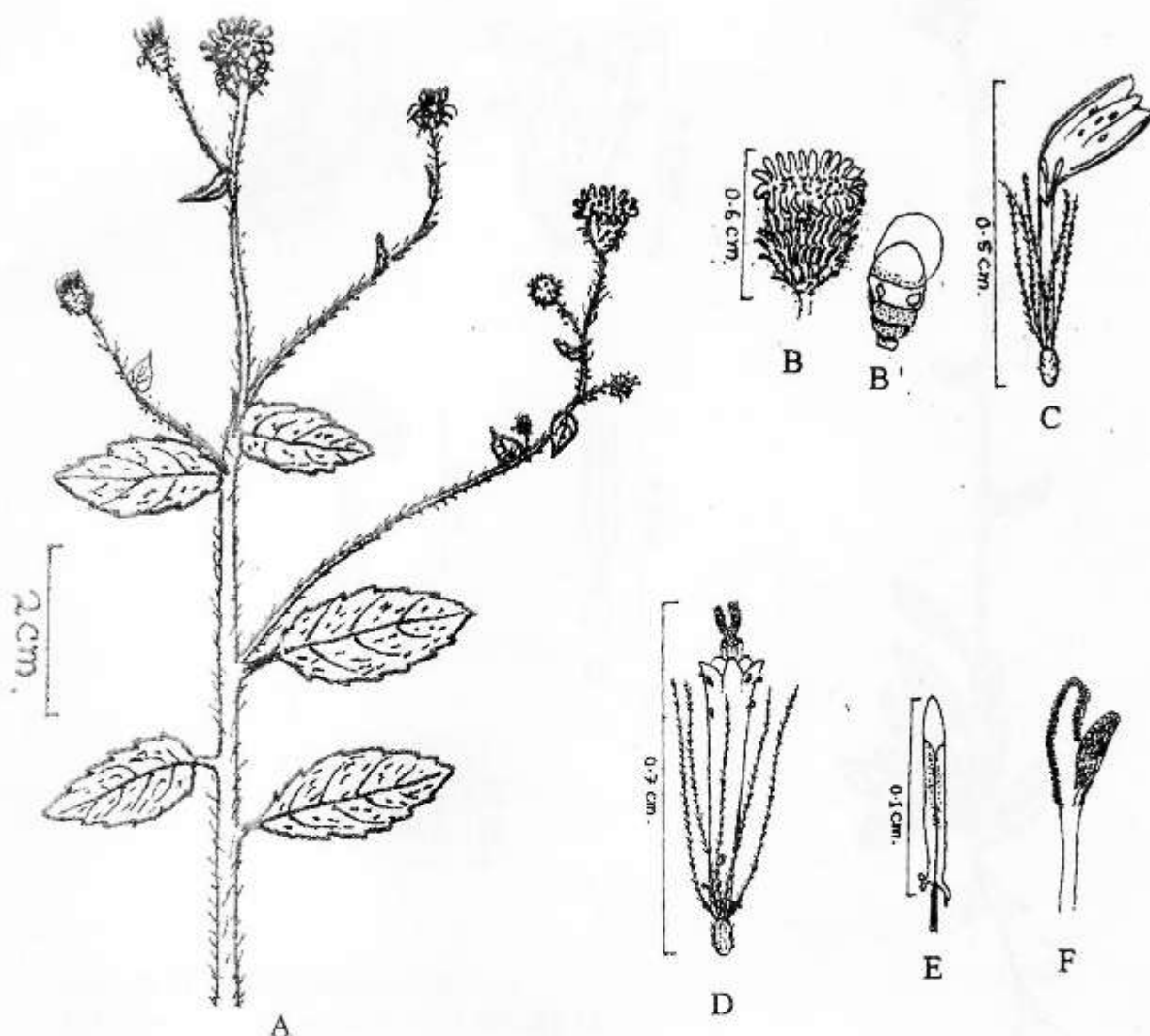
Herbs 30-40 cm. tall. Glabrous. Stem ribbed. Leaves glabrous above, thinly tomentose below. Radical leaves spreading, narrowed into a winged stalk. Cauline leaves few distant, sessile; margin not lobed. Capitula in terminal corymbs. Involucral bracts acute, 3 nerved, ligules yellow, conspicuous. Disc florets glandular hairy at tips. Achenes not observed. Anther almost  $\frac{3}{4}$  the length of corolla tube. Style truncate, papillate.

**Flrs. & Frts. :-** Dec. - Jan.

**Locality :-** On Vairat hills along moist slopes.

**Exsiccata :-** VDD.251.

ASTERACEAE  
*Vicoa cernua* Dalz.



A - Habit sketch, B - Single Capitulum, B' - Glandular hair, C - Ray Floret, D - Disc. Floret, E - Single Stamen, F - Stigma.

*Vicoa cernua* Dalz. in Dalz. & Gibs. Bombay Fl. 126 & 314. 1861; Hook. Fl. B. I. 3: 297.

Erect, slender herbs, 20 - 40 cm. tall. Leaves lanceolate, narrowing at both ends, serrate, sparsely hairy, shortly but distinctly petiolate. Heads yellow in axillary or terminal lax panicles. Peduncles 1 - 3 cm. long, slender. Involucre many seriate; bracts recurved. Marginal florets ligulate, in 1 - 2 series; disc florets tubular, glandular, ovary sparsely hairy, truncate; style smooth; stigmas broad, papillate. Pappus as long as corolla. Achenes obovoid, ribbed, hairy.

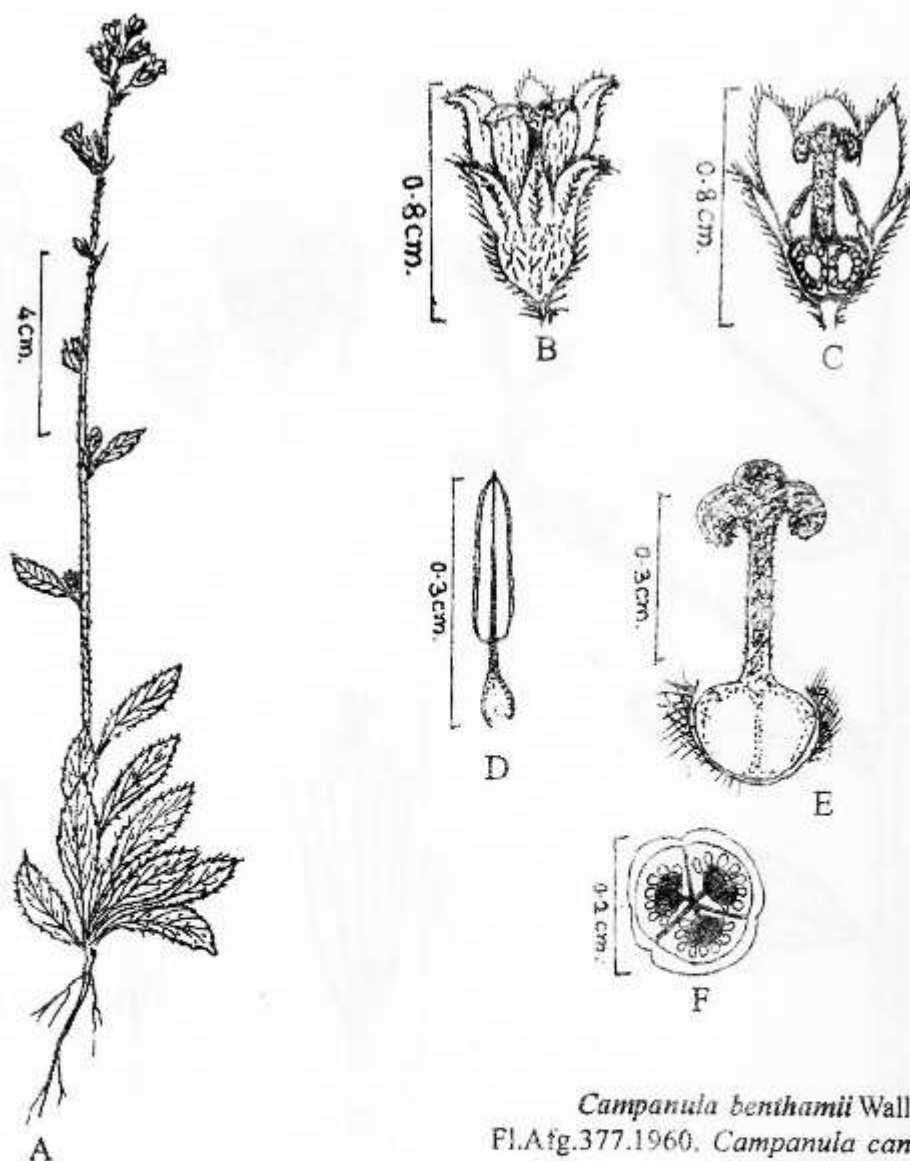
Flrs. & Frts. :- Oct. - Dec.

Locality :- Along the road to Semadoh on moist shady slopes.

Exsiccata :- PYB. 30.



**CAMPANULACEAE**  
*Campanula benthamii* Wall.



A - Habit sketch, B - Single flower, C - L.S. flower,  
 D - Single stamen, E - Gynoecium, F - T.S. Ovary.

*Campanula benthamii* Wall. ex. kitamura.  
 Fl. Afg. 377. 1960. *Campanula canescens*, Wall.  
 ex. DC. Prodr. 7: 473. 1839. (non Roth, 1827;).  
 Clarke in Hook. Fl. B. 1.3: 439. 1881. *Campanula*  
*wallichii* Babu. in Journ. Bomb. Nat. Hist. Soc.  
 65. 808. 1969. et. Herb. Fl. Dehra Dun 294. 1977.

Small annual herbs, 20-25 cms. tall, pubescent. Leaves rosette as well as cauline, linear lanceolate, dentate, membranous, gradually becoming smaller towards apex. Flowers solitary axillary, gradually becoming racemose or spiciform upwards. Calyx campanulate, densely hairy, green. Corolla bright purple hairy; stamens 5, filament short, dilated to the base; anthers elongate. Ovary adnate to calyx tube, tapering into the pedicel, trilocular with axile palcenta; style single, stout, hairy; stigmas three, curved. Fruit capsule, dehiscing loculicidally; seeds numerous, ellipsoid, slightly compressed.

**Flrs. & Frts.** :- Dec-Jan.

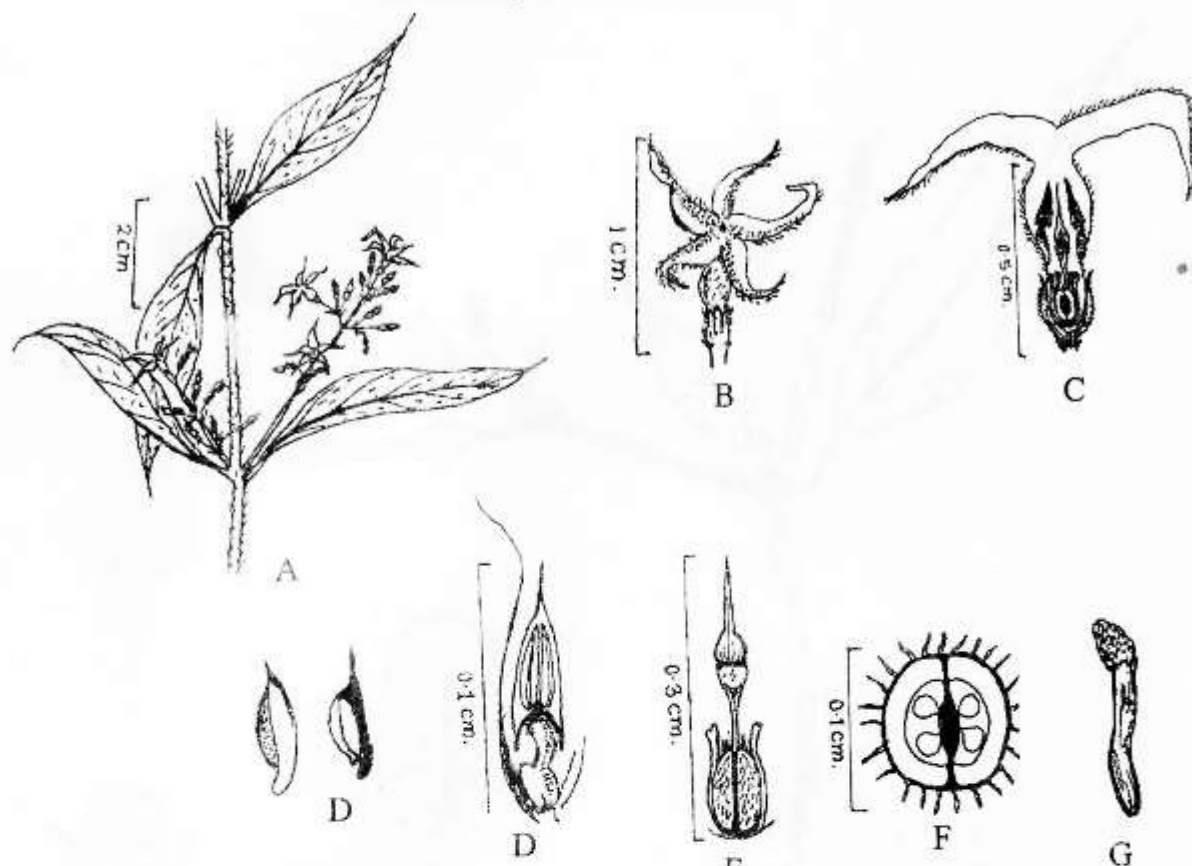
**Locality** :- Along Kukaroo road.

**Exsiccata** :- VDD. 7.

First record for Vidarbha.

# APOCYNACEAE

## *Ichnocarpus ovatifolius* A.DC.



A - Habit sketch, B - Single flower,  
C - L.S. Flower, D - Stamen, E - Gynoecium,  
F - T.S. Ovary, G - Single nectary.

*Ichnocarpus ovatifolius* A.DC. Haines, Bot. Bih. & Ors. 2:573. 1961.

Straggling shrubs, much branched; stem cylindrical, hairy. Leaves waxy, opposite, 6-10 x 1-2.5 cm, sparsely tomentose, elliptic - oblong, acuminate, base rounded. Flowers small, 1 cm across in many flowered axillary and terminal dichasial paniculate cymes; pedicels 3-5 mm. Calyx 5-fid, hairy; lobes ovate, acute. Corolla tube 4 mm long, hairy, a narrow, dilated in the middle and constricted below the lobes; lobes 4-5 mm long, overlapping to the right. Stamens 5, inserted in the middle of the corolla tube; anthers sagittate, conniving over and adhering to the stigma, cells spurred at base; connective produced in a long straight acumen. Ovaries 2, densely hairy; style short; stigma ovoid oblong, constricted in the middle and produced into an acumen. Follicles not seen.

**Flrs. & Frts. :-** Oct - Dec.

**Locality :-** Harisal.

**Exsiccata :-** PYB. 339.

**Rare.** First record for Maharashtra. Patel has recorded the presence of *I. frutescence*, R.Br. in melghat. Infact all Indian floras mention only single species of *Ichnocarpus* i.e. *I. frutescence*; H.H. Haines (1961) describes as additional species i.e. *I. ovatifolius*, DC. However he has stated De Candolle who himself is not sure about the distinct status of *I. ovatifolius*, the differences noted by him being not adequate. He distinguished two species on the basis of pubescence of corolla tube and puberulous surface of mouth. However present species shows distinct differences from that of *I. frutescence*. The differences between 2 species are as follows.

*I. ovatifolius*, DC. - Corolla tube densely pubescent outside, mouth puberulous; stamens with basal spur and erect apical acumen.

*I. frutescence* R.Br. - Corolla tube and mouth glabrous; anther lobes pubescent on upper side; connective produced into long falcate, slender twisted acumen deflexed in bud and flower.

The mention of *I. ovatifolius*, DC. as a distinct species is thus justified.

ASCLEPIADACEAE

*Ceropegia oculata* Hook.



A - Habit sketch, B - Single flower,  
C - Pollinial sacs.

*Ceropegia oculata* Hook. Bot.Mag. (1844)  
t. 4093 m. Fl.B.I.4:72.Dalz. & Gibbs. P. 154. Ansari.  
(1984) Asclepiadaceae : Genus - *Ceropegia*.  
Fasc.Fl. Ind. 16; 26. t. 4 (20), Santapau. H. & Irani,  
N.A. (1958). The genus *Ceropegia* in Bombay;  
Bull. Bot Soc. Beng 12 (! & 2); 12.t.1, f.j.

Annual. Herbaceous twiner. Stem terete, glabrous. Leaves membranous, petiolate, ovate - cordate, acuminate, more or less pubescent. Flowers in 4 to 8 flowered axillary umbellate cymes; peduncles usually clothed with spreading hairs. Calyx divided 3 to 5 cm.long, pale green in lower part, the upper part of the tube spotted with purple & more darker. Tube curved, much inflated at base, narrow in middle and enlarged at the mouth. Lobes 1/3 the length of the tube; pubescent towards the upper part; tips connate. Corona biseriate, outer of 5 shortly bifid corona teeth, ciliate; inner corona lobes slender, erect, striate, not hooked at tip. Pollinial sacs found to be empty (Probably due to male sterility). Follicles not seen.

**Flrs. & Frts. :-** July. - Sept.

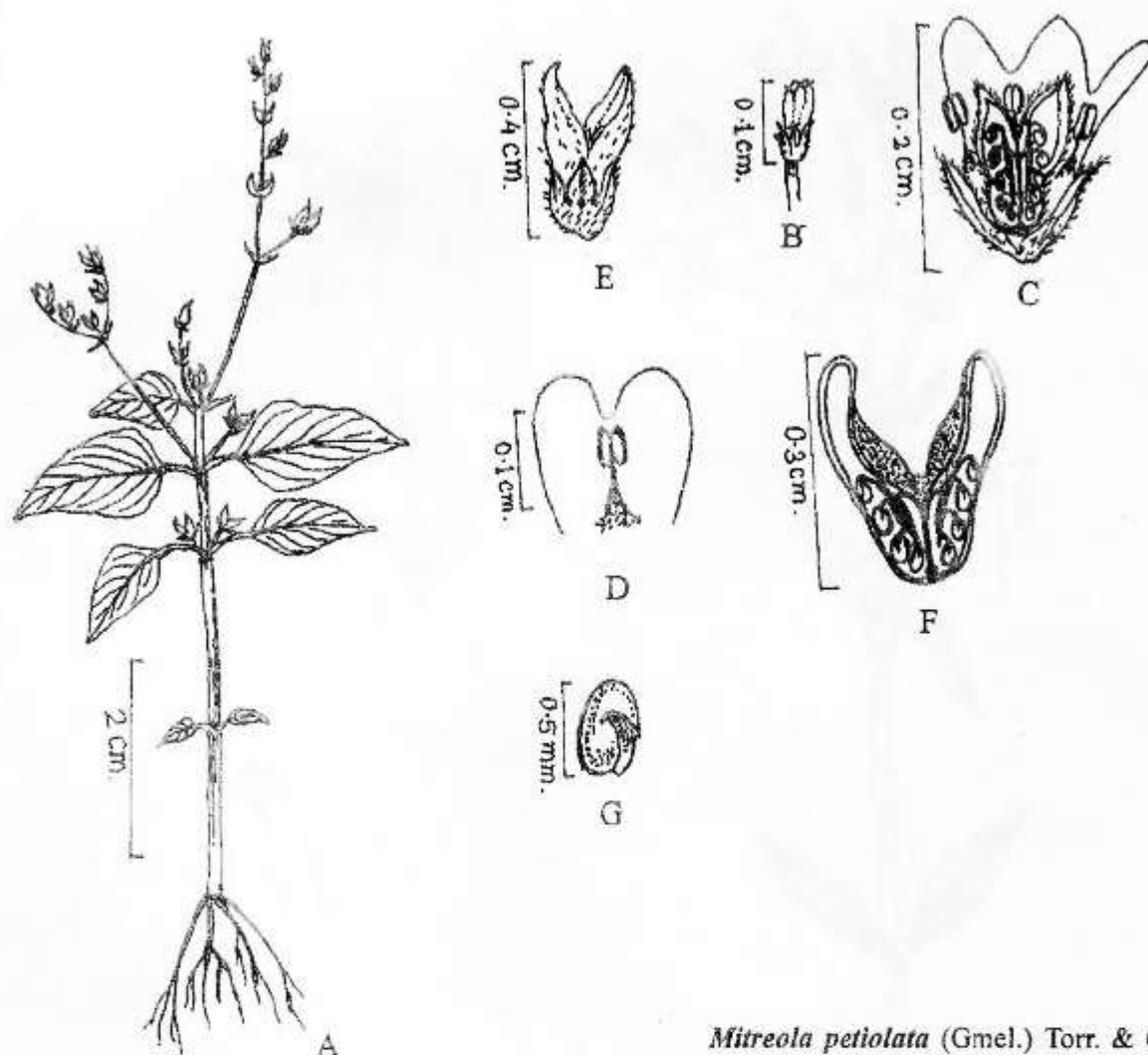
**Locality :-** Collected from Bhutkhora.

**Exsiccata :-** PYB.256.

**First record for Vidarbha region.** *Ceropegia oculata* Hook. is endemic to Maharashtra, so far known to occur in Pune, Ratnagiri and Raigad distt. It is an endangered species and BSI has suggested in situ conservation of the species as efforts to grow the plants in experimental gardens has failed. (RDB 1988).

# LOGANIACEAE

*Mitreola petiolata* (Gmel.) Torr. & Gray.



A - Habit sketch, B - Single flower, C - L.S. flower,  
D - Single stamen, E - Gynoecium,  
F - L.S. Ovary, G - Seed.

*Mitreola petiolata* (Gmel.) Torr. & Gray,  
Fl.N.Amer. 2:45. 1841; Babu, Herb. Dehra Dun  
309.1977. *Cynoctorum petiolatum* J.F.Gmel. Syst.  
Nat ed. 13, 2:443. 1791. *Mitreola oldenlandioides*  
G.Don, Syst. 4:172.1837; Clarke in Hook  
Fl.B.I.4:79.1883.

Slender annual herbs, 10-15 cm, glabrous; stems quadrangular. Leaves opposite in 2-3 pairs, ovate lanceolate, membranous, shortly petiolate, decurrent over the internode. Flower minute in terminal as well as axillary, long peduncled, 2-4 times forked cymes with single shortly pedicelled flower at the base of fork; flowers subsessile; basal leaves with solitary axillary flowers. Calyx green pubescent divided less than 1/2 way down; lobes linear, obtuse. Corolla white, 1.5-2 mm, lobes-5, obtuse. Stamens 5, included, epipetalous. Ovary bilocular, glabrous; fruit 2 horned, erect deeply emarginate with up curved lobes.

Flrs. & Frts. :- Aug. - Nov.

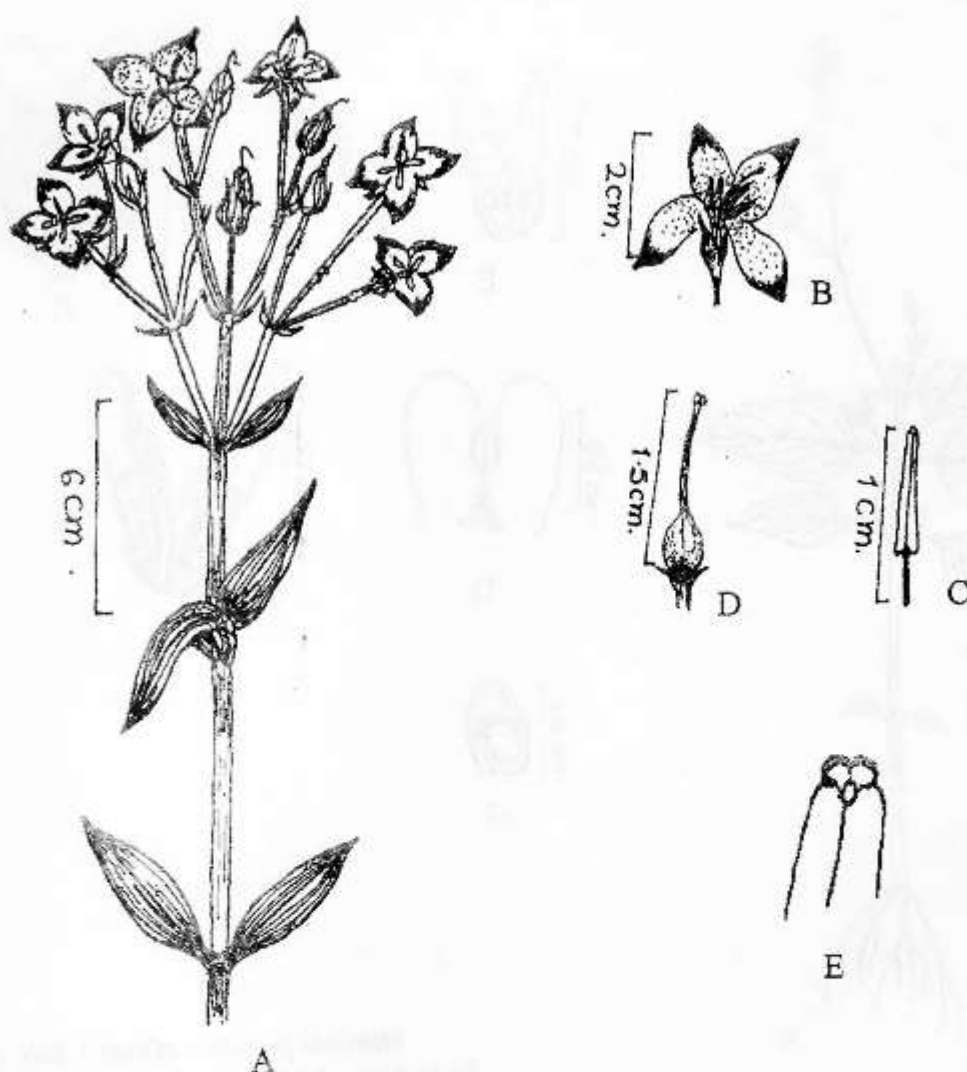
Locality :- Kolkaz, Semadoh on moist grounds in forest undergrowth.

Exsiccata :- PYB. 340

Not common. First Record for Vidarbha.



**GENTIANACEAE**  
*Exacum bicolor* Roxb.



A - Habit sketch, B - Single flower,  
C - Stamen, D - Gynoecium, E - Pores of anther cells

*Exacum bicolor* Roxb. Hook, Fl.B.I.4:96;  
Woodr. in Jour. Bomb.Nat. v.12 (1898) p.168;  
*Exacum tetragonum*, var. *bicolor*, bot. Mag. (1847)  
t. 4340.

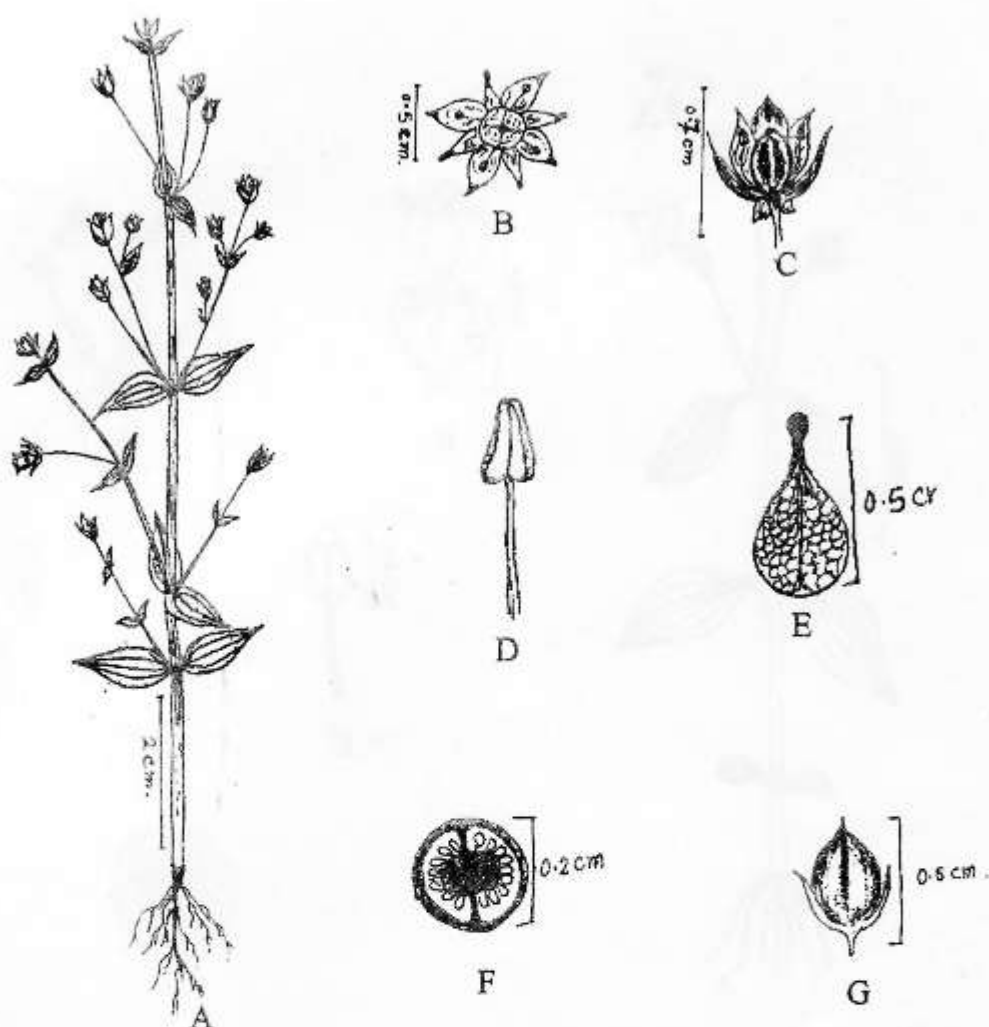
Large herbs, 2 -3 ft. tall; stem quadrangular. Leaves opposite, sessile, 7-10 by 3 -4 cms, elliptic lanceolate, acute, glabrous, 3 nerved; Inflorescence cymose with profuse flowering. Flowers in dichotomous cymes, terminal as well axillary; pedicels 0.5-7 cm. long; bracts linear lanceolate, acute. Calyx deeply 4 lobed, 1.5-2 cm. long, ovate, membranous, acuminate, keel with prominent wing which is decurrent on pedicel. Corolla white with bright violet tips, 2.5-3 cm. long; lobes obliquely obovate, acute. Stamens 4 inserted on corolla mouth, filaments short, dilating towards base; anthers bright yellow coloured. Ovary bicarpellary syncarpous; ovules many in each locule; style long; stigma capitate. Capsule 1-1.5 cm. long, ellipsoid, shiny, apiculate, yellowish - brown.

**Flrs. & Frts. :-** Oct. - Jan.

**Locality :-** Bori nallah.

**Exsiccata :-** PYB. & VDD. 217.

**GENTIANACEAE**  
*Exacum lawii* C.B. Clarke.



A - Habit sketch,  
B - Single flower (Top view), C - L.S. flower.  
D- Stamen, E-Gynoecium, F- T.S.Ovary, G-Capsule

*Exacum lawii* C.B. Clarke, in Hook.  
Fl.B.I.4:98.1883. Woodr. in Journ. Bomb. Nat. v.  
12 (1898) p. 168.

Small erect herbs, 15-20 cm. high; stem, quadrangular with distinct wings along internodes. Leaves opposite, sessile, glabrous, ovate, acute, three nerved. Flowers on axillary or terminal, 1-2 inches, long peduncles. Inflorescence few flowered cyme. Flowers pedicellate; pedicells 1.5 - 2 cm long; tetramerous, the terminal one usually pentamerous. Calyx 4-5 partite, broadly ovate, larger than petals; midrib strong; petals 4 -5, dark blue, narrower than sepals. Stamens 4-5, filaments long; filiform; anthers yellow. Ovary glabrous; Style absent; stigma sessile. Fruit a subglobose or ovoid capsule. Seeds numerous, blackish brown, minute.

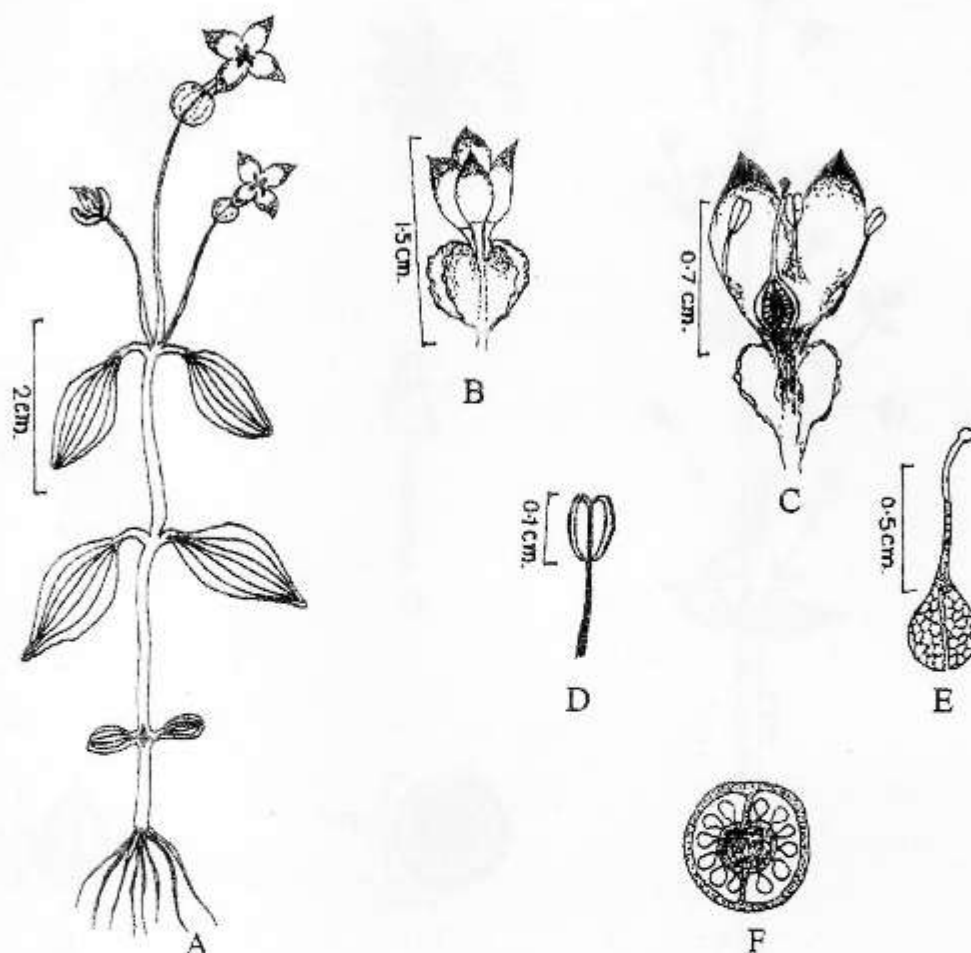
**Flrs. & Frts. :-** Aug. - Nov.

**Locality :-** Masoondi

**Exsiccata :-** PYB. & VDD. 341

First record for Vidarbha. The present species differs from other species in absence of style.

**GENTIANACEAE**  
*Exacum pumilum* Griseb.



A - Habit sketch, B - Single flower, C - L.S. flower,  
D - Single stamen, E - Gynoecium, F - T.S. Ovary.

*Exacum pumilum* Griseb. in DC. Prodr. IX. 46; Wight Ic.t.1324; Dalz. & Gibs. Bomb. Fl. 157; Clarke in Journ. Linn.Soc.xiv.427. Fl. B.I.4:98.

Annual herb, erect, 4 - 9 in. high; stems quadrangular. Leaves opposite, entire, thin, sessile, lanceolate, 3 - nerved, decurrent, 3 - 5 cm., long. Inflorescence cymose, 1 - 3 flowered, axillary or terminal. Flowers sky blue; peduncles slender, long; pedicels filiform, sometime 2 cm. long. Calyx deeply 4 lobed, thinly membranous, winged, 0.5 - 0.7 cm; wings obtuse at base. Corolla blue, rotate, tube short; globose; lobes 4, ovate, 0.7 cm. blue. Stamens 4 on corolla throat, filaments short slightly dialated at the base; anthers oblong straight, dehiscing by terminal pores extending into lateral slits. Ovary 2 - celled, ovules many in each cell ; style long; stigma capitate. Capsule subglobose, seeds many, minute, reticulate.

**Flrs. & Frts. :-** Aug. - Oct.

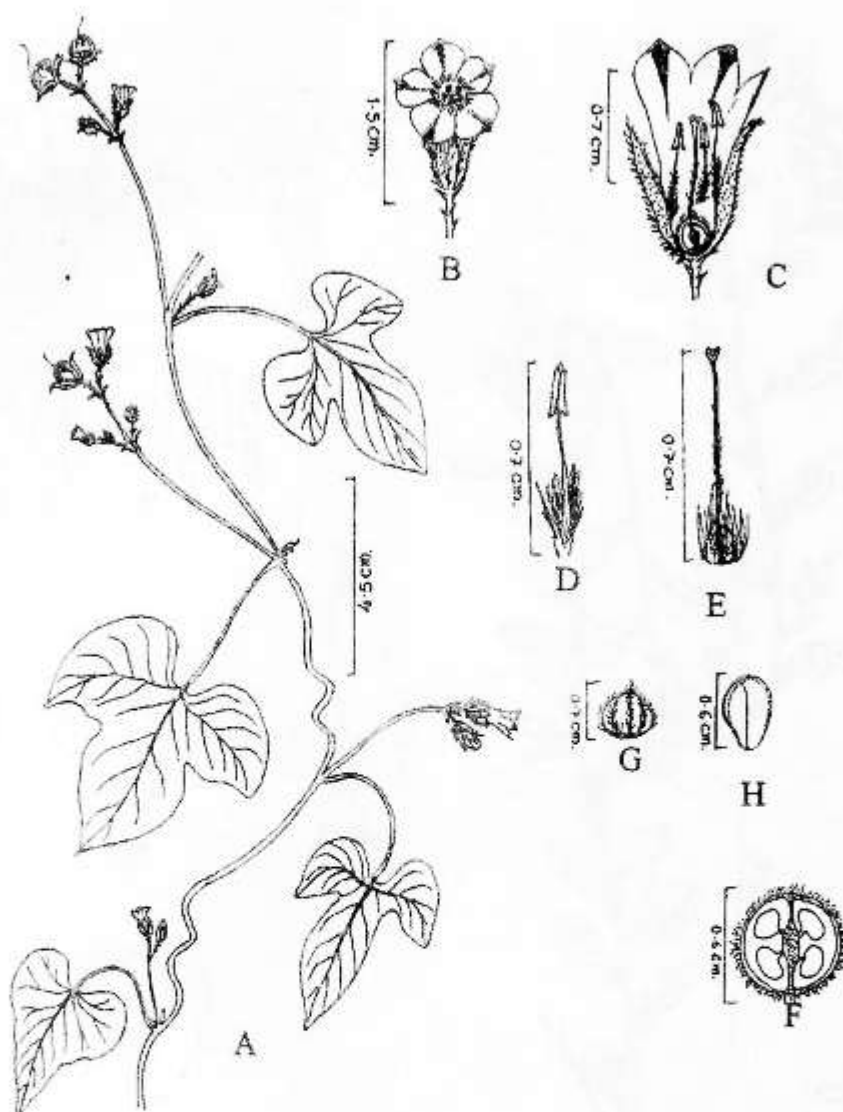
**Locality :-** Ghatang - Semadoh road, on moist shady slopes.

**Exsiccata :-** PYB. 285.

Some consider it as a form of *Exacum pedunculatum* Linn. but the species is distinct by its small delicate form and mostly solitary blue flowers.

# CONVOLVULACEAE

## *Ipomoea triloba* Linn.



A - Habit sketch, B - Single flower, C - L.S. flower,

D - Single stamen, E - Gynoecium,

F - T.S. Ovary, G - Capsule, H - Seed.

*Ipomoea triloba* Linn Sp.pl.161, 1753;  
Fernandes et.al. in Journ. Bombay. Nat. Hist. Soc.  
52:661; 1954; shah, Fl. Gujarat, 1: 475, 1978.

A slender glabrous twiner. Lower leaves ovate triangular, upper ones trilobed, petioles 3-5 cm; lamina 6 x 5 cm at its broadest. Inflorescences axillary, long peduncled cymes; peduncles longer than petioles. Flowers shortly pedicellate. Calyx divided for more than half distance, hairy. Corolla pink purple; lobes plicate, rounded, mucronate. Stamens 5, included, somewhat unequal; filaments densely hairy towards base; anthers sagittate. Ovary bilocular with 2 ovules in each locule, globose, hairy; style shorter than corolla tube. Fruit thinly hairy, globose capsule; hairs deciduous.

Flrs. & Frts. :- Aug - Dec .

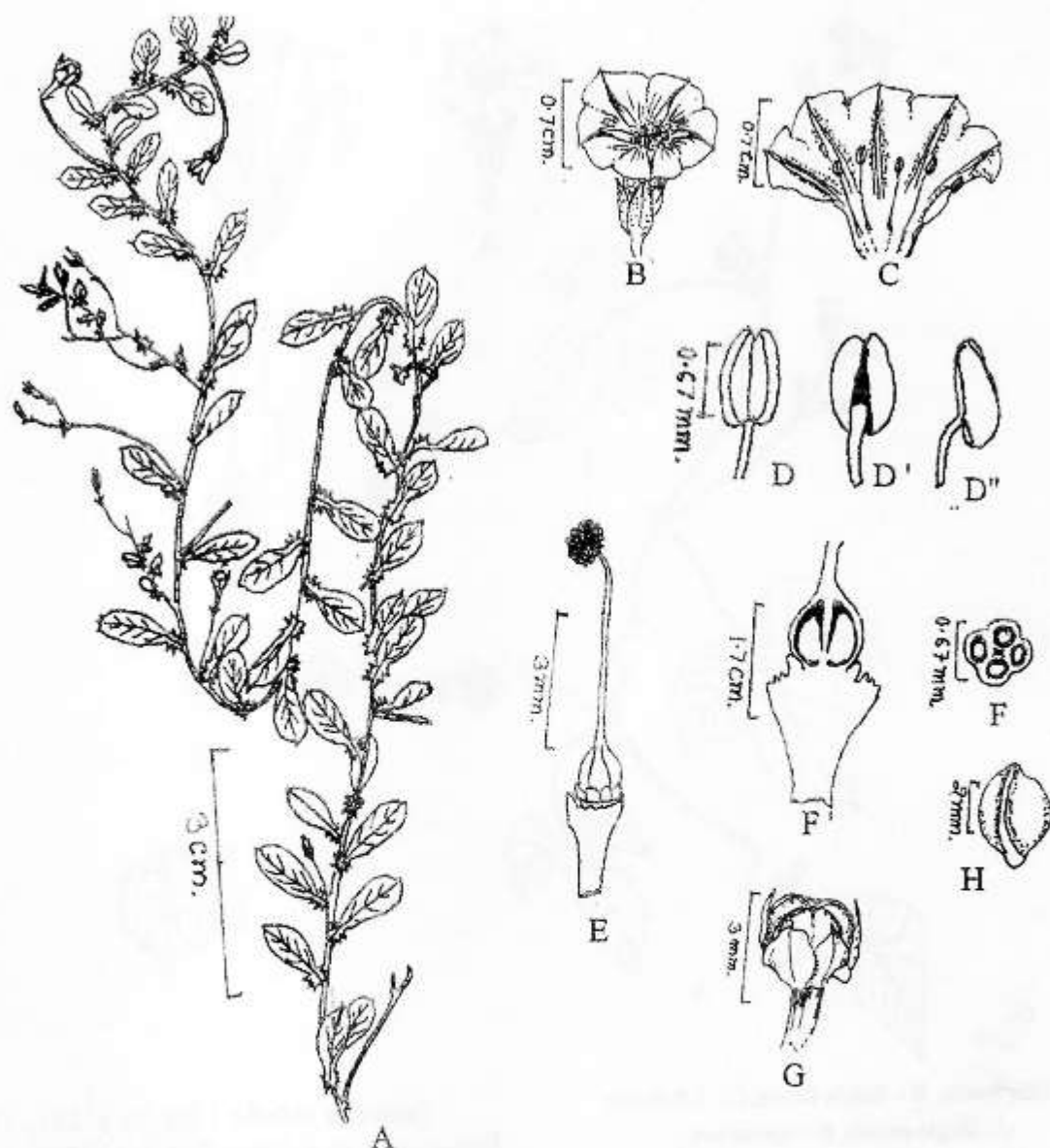
Locality :- Amravati proper.

Exsiccata :- VDD. 4.

First record for Vidarbha. The plant has been recently introduced in Amravati, most probably along with the building material. First was noted in front of Govt. offices where construction was going on. Now spread in many localities.



CONVOLVULACEAE  
*Merremia tridentata* (L.) Hallier



A - Habit sketch, B - Single flower, C - Stamens inserted on corolla mouth, D, D', D'' - Anthers, E - Gynoecium, F - T.S.Ovary, F' - L.S.Ovary, G - Capsule, H - Single seed.

*Merremia tridentata* (L.) Hallier. F. *Ipomoea tridentata* (L.) Roth. Hook. Fl. B.I.4:205. 1885; Gamble, Fl. Madras 2; 928 (652). 1923; Matthew, Mat. Fl. Tamilnadu Carnatic 275:1981.

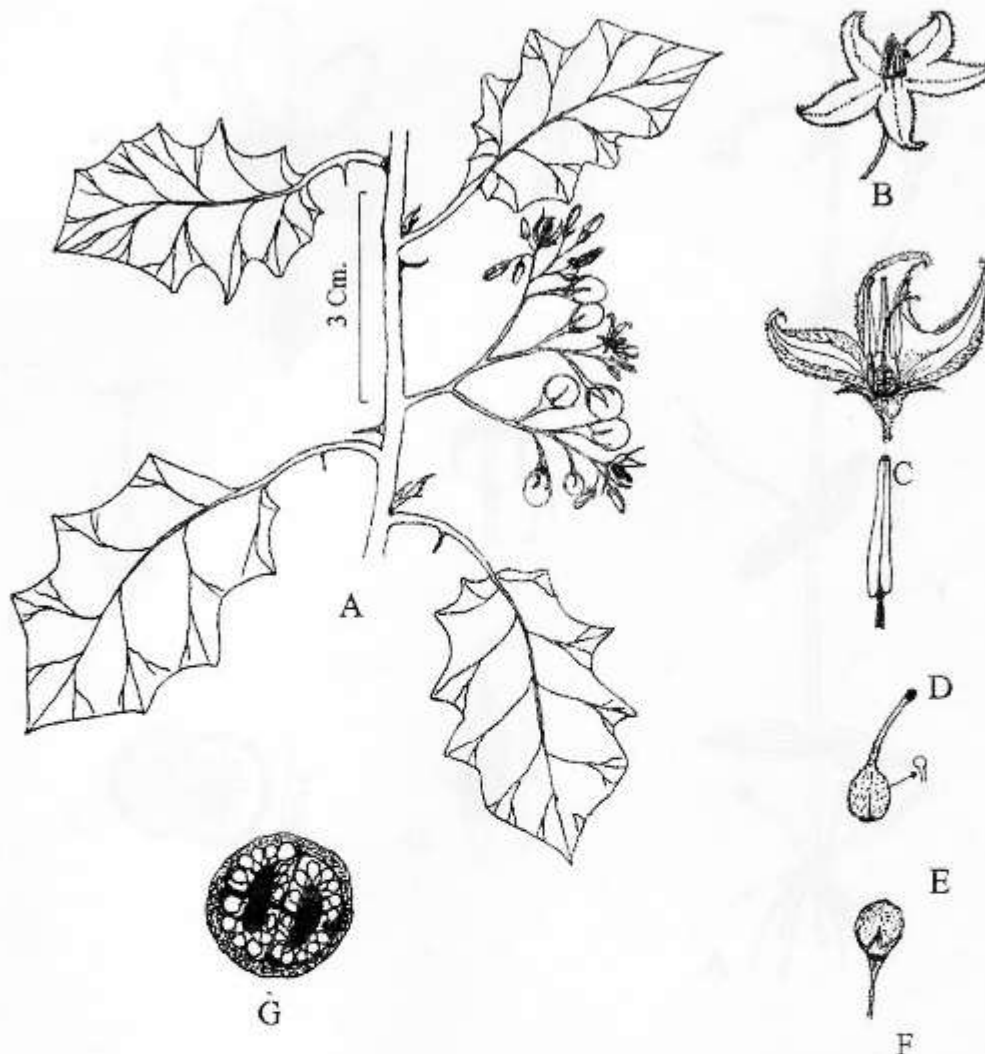
Small prostrate herbs with woody root stock; never climbing, glabrous. Leaves simple, oblong, obtuse, mucronate; base tridentate. Flowers in axillary long peduncled cymes; bracts dentate. Calyx lobes subequal, outer three acuminate inner two acute. Corolla pale cream, plicate. Stamens reaching upto the mouth of tube; filaments glabrous, ovary on lobed nectary disc; 4-chambered, 4-lobed, ovule one in each locule; style long, reaching the corolla mouth; stigma single capitate. Capsule globose, glabrous.

Flrs. & Frts. :- Oct. - Jan.

Locality :- Morshi, along river banks.

Exsiccata :- VDD. 5.

**SOLANACEAE**  
*Solanum torvum* Swartz.



A - Habit sketch, B - Single flower, C - L.S. flower,  
D - Single stamen, E - Ovary, F - Fruit, G - T.S. Ovary.

*Solanum torvum* Swartz. Prod. Descr. Veg.  
(1788) p. 47 Fl. B.I.4:234; Dalz. & Gibs. p. 175;  
Watt, Dict. Econ. Prod. 6. (3):264.

Large shrubs 8 - 12 ft. high, densely covered with stellate hairs; stem and petioles prickly, few may be present on midrib on the under side of leaf. Leaves ovate - lanceolate, 8 by 4 in., base oblique - cordate. Inflorescence adnate, cymes helicoid, arranged in corymbose fashion. Flowers white, 1.5 to 2 cm. Calyx 5 lobed, green. Corolla rotate; tube very short. Petals 5, white. Stamens 5 in the corolla throat; filaments short, 0.1 cm; anthers oblong, connivent in a short cone, dehiscence terminal by pores. Ovary 2 - celled but at maturity becoming 4 celled, covered by gland tipped hairs; stigma capitate. Berry globose, glabrous, yellow when ripe.

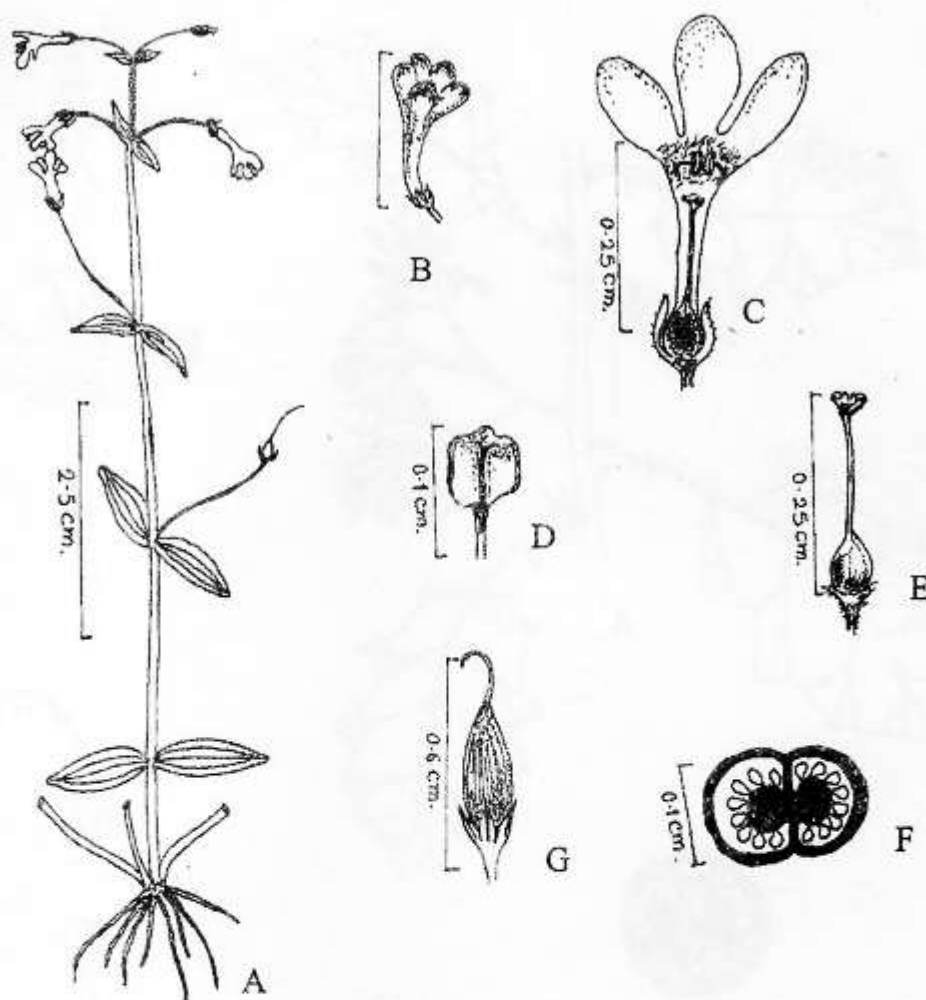
**Flrs. & Frts. :-** Sept. - Jan.

**Locality :-** Gavilgad.

**Exsiccata :-** PYB. 216a

First record for Maharashtra.

**SCROPHULARIACEAE**  
*Dopatrium lobeliodes* (Retz.) Benth.



A - Habit sketch, B - Single flower,  
 C - L.S. flower, D - Single stamen,  
 E - Gynoecium, F - T.S. Ovary, G - Capsule.

*Dopatrium lobeliodes* (Retz.) Benth.  
 Scroph. Ind. 3 I, 1835; F.B.I. 4 : 274, 1884;  
*Gratiola lobelioides* Retz. obs. 4 : 7, 1786.  
 Subramaniam. Aq. Angio. 1962.

Erect, small, slender, fleshy, marshy, 10-15 cm. herb. Leaves few, opposite, the lower pair small upper minute, distantly placed. Flowers small, solitary, axillary, white, faint violet; bracteoles absent; calyx small, 5 partite, lobes narrow, imbricate; corolla 1 mm., bilabiate; the slender tube dilated to a broad throat, the outer upper lip short, 2 - fid; lower broad, spreading, 3 - lobed; 2 upper stamens perfect, included; filaments filiform, anther cells parallel, distinct, equal; lower pair reduced to minute staminodes; ovary superior, 2 - celled with many ovules borne on axile placentae; style short; stigma 2, lanceolate. Fruit a small, oblong, loculicided capsule, the valves placentiferous. Fruiting pedicels upto 2.5 in. long, horizontally spreading. Seeds many, very small, reticulately tuberculate.

**Flrs. & Frts. :-** Nov. - Jan.

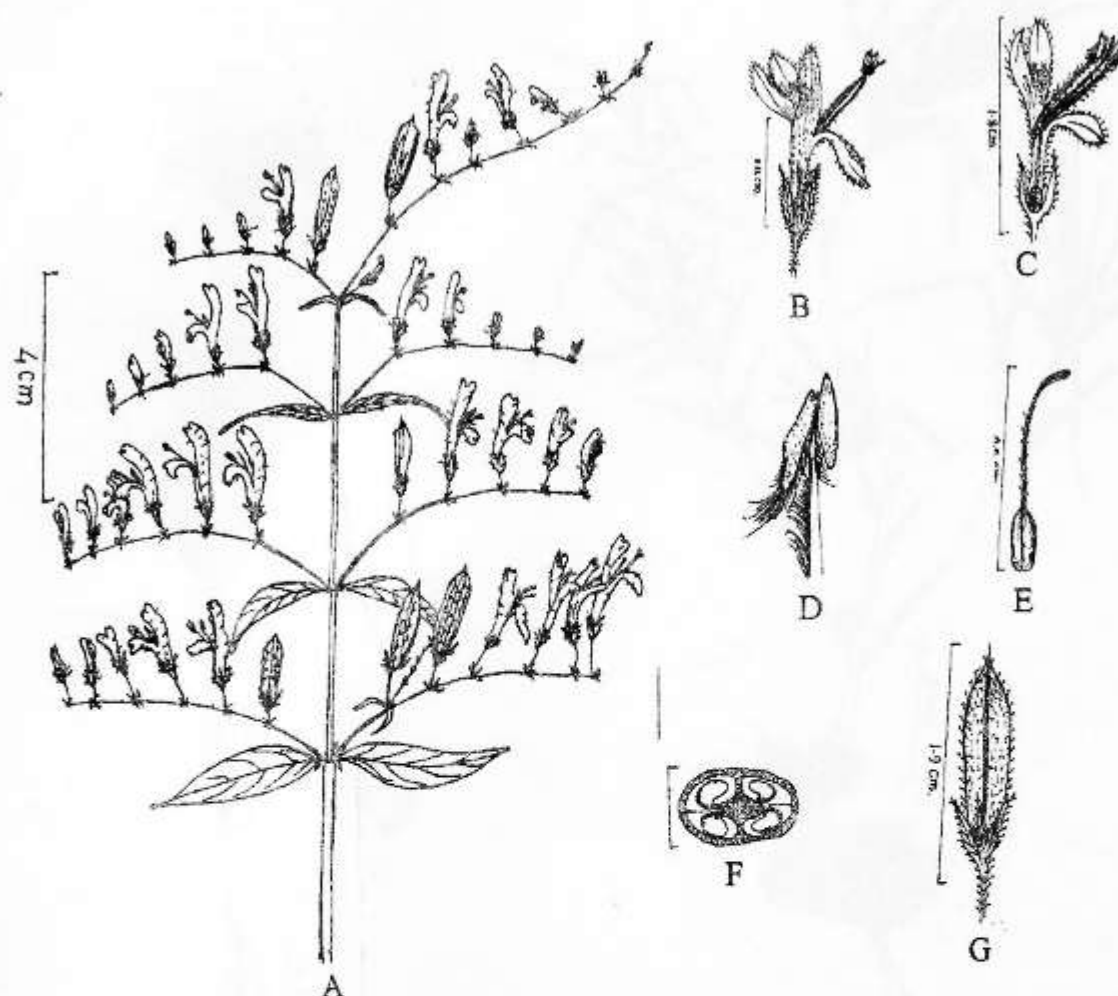
**Locality :-** Narnala fort - on the margins of Lake.

**Exsiccata :-** PYB. 344.

First Report for Maharashtra.

# ACANTHACEAE

*Andrographis paniculata* (Burm.f) Wall.ex. Ness.



A - Habit sketch, B - Single flower, C - L.S. flower,  
D - Single stamen, E - Gynoecium,  
F - T.S. Ovary, G - Capsule.

*Andrographis paniculata* (Burm.f) Wall.ex. Ness in wall. pl. as; rar. 3:116. 1832; Clarke in Hook.F1.B.I.4:501.1884; *Justicia paniculata* Burm. f. Fl. India I.1768; Naik Fl. Marathwada 1:658. 1998.

Erect, branched, glabrous herbs, 30-70 cm tall, stem 4-angled. Leaves lanceolate, 1.5-5.5 x 0.3-2 cm, opposite, entire, undulate, acute, dark green, glabrous. Inflorescence branched, terminal, unilateral. Flowers bilabiate, white with purple strong lines on inner side; bracteate; bracts linear lanceolate 1.5-2 mm long. Pedicel 1-3 mm long, glandular pubescent. Calyx 2.5-3 mm long; sepals linear lanceolate glandular pubescent. Corolla white with pink throat, 7-9 cm long, glandular pubescent from outside; lobes linear oblong, 2-2.5 mm long sub-obtuse. Stamens 2, anthers bearded at base, placed at two levels; filaments hairy throughout. Ovary glabrous; style slightly pubescent; stigma simple, flat. Capsules 1.5-2 cm long, linear oblong, acute at both ends, apiculate, hairy; hairs glandular. Seeds numerous, rugosely pitted, glabrous, yellow brown.

**Frts. & Frts. :-** Dec. - Feb.

**Locality :-** Makhala

**Exsiccata :-** PYB. & VDD. 345.



# ACANTHACEAE

## *Lepidagathis brandraensis* Blatter.



A - Habit sketch, B - Inflorescence unit,  
C - Outer bract, D - Inner bract, E - L.S. flower,  
F - Single stamen, G - Gynoecium.

*Lepidagathis brandraensis* Blatter. in J  
Asiat. Soc. Bengal N.S. 26:347. 1930; Santapau  
in Uni. Bombay Bot. Mem. 2:75. 1951. *L. trinervis*  
Blatt. & Hallab. 26 (3) : 812. 1919 non Nees 1832.

A small herb perennating by woody stock; branches slender 8-15 cm long. Leaves sessile, linear, subacute, entire, glabrous, 3 nerved marginal nerves thin, some what obscure. Inflorescence axillary spikes, mostly crowded in lower axils, usually solitary in upper axils. Bracts spiny, recurved, purple; bracteoles as long as bracts, dimorphic, aristate, acuminate, inner hooked. Calyx membranous, 5-partite, unequal; corolla deep purple, densely hairy, bilipped; ovary hairy; capsule densely hairy, 2 seeded.

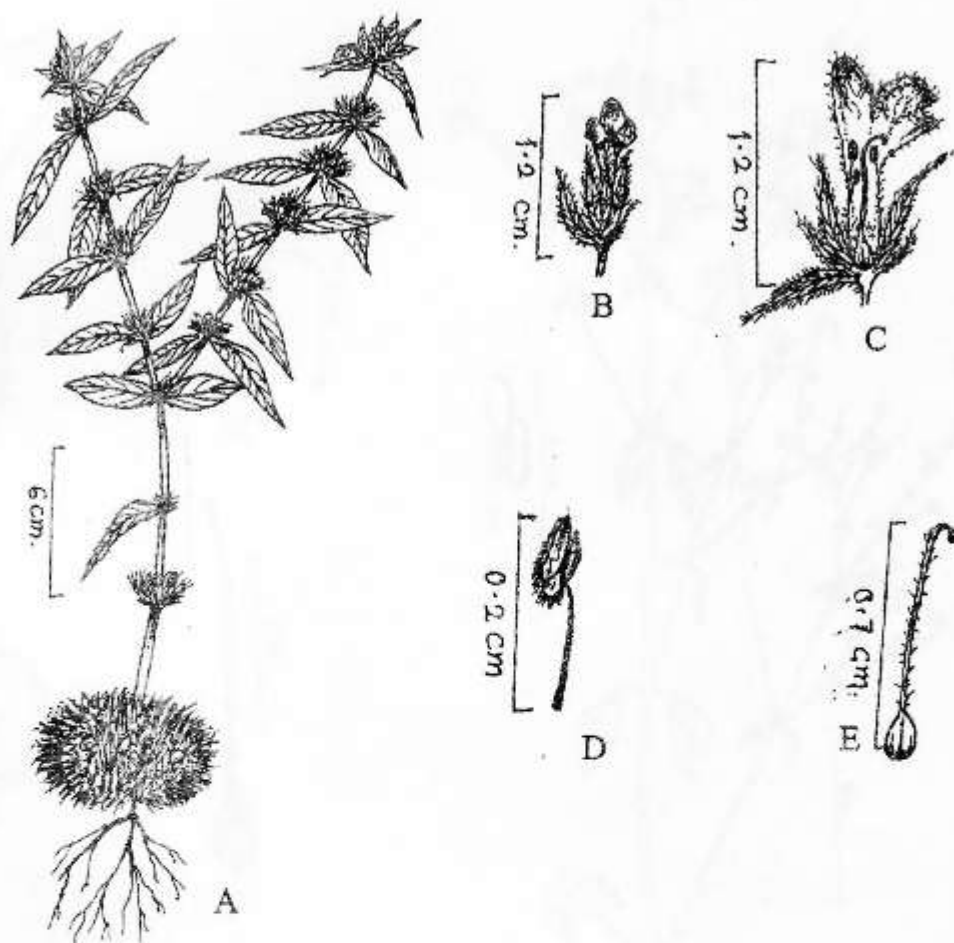
Flrs. & Frts. :- Sept.- Jan

Locality :- Narnala.

Exsiccata :- PYB 346.

First record for Vidarbha.

**ACANTHACEAE**  
*Lepidagathis lutea* Dalz.



A - Habit sketch, B - Single flower,  
C - L.S. flower, D - Single stamen, E - Gynoecium.

*Lepidagathis lutea* Dalz. in Kew Journ. Bot. v.2(1850) p.139; Fl.B.I.4:517; Dalz. & Gibs. p.190; Woodr in Journ. Bomb. Nat. v.12 (1899) p.357.

Woody herbs perennating by rootstocks. Branches suberect, filiform, quadrangular, pubescent. Leaves entire, sessile, 2-5 x 0.5 - 0.7 cm long, linear, acute, glabrous, 3-nerved, base tapering. Inflorescence subradical as well as axillary, congested globe. Flowers 1-3 in axils and in subradical congested globes; flowers yellow or white, bracts variable in length 1.5 - 1.7 cm long, the outer herbaceous, long-acuminate from a broadly ovate base, sharply spinescent, the inner bracts shorter, membranous, silky-hairy, usually spinous pointed; bracteoles 1.5 - 1.7 cm long, silky hairy on both sides, spinous pointed. Calyx 1.5 cm. long, 5-partite; segments thick, upper slightly longer than lower 2, acuminate. Corolla cream or white yellow 1.5 - 1.7 cm long, tube narrowly cylindric, about 0.6 cm and then abruptly expanded, limb pubescent outside; upper lip short; lower lip 3-lobed; lobes obtuse, middle one twice as long as laterals. Stamens 4, didynamous, attached at the base of throat; filaments very short, glabrous; anthers 2-celled, one cell often higher up than other, bearded. Ovary 2-celled; ovules 2 in each cell; style long, recurved, pubescent; stigma capitate, entire. Capsules ovoid-lanceolate. 2-seeded. Seeds with very long hygroscopic, mucilagenous hairs.

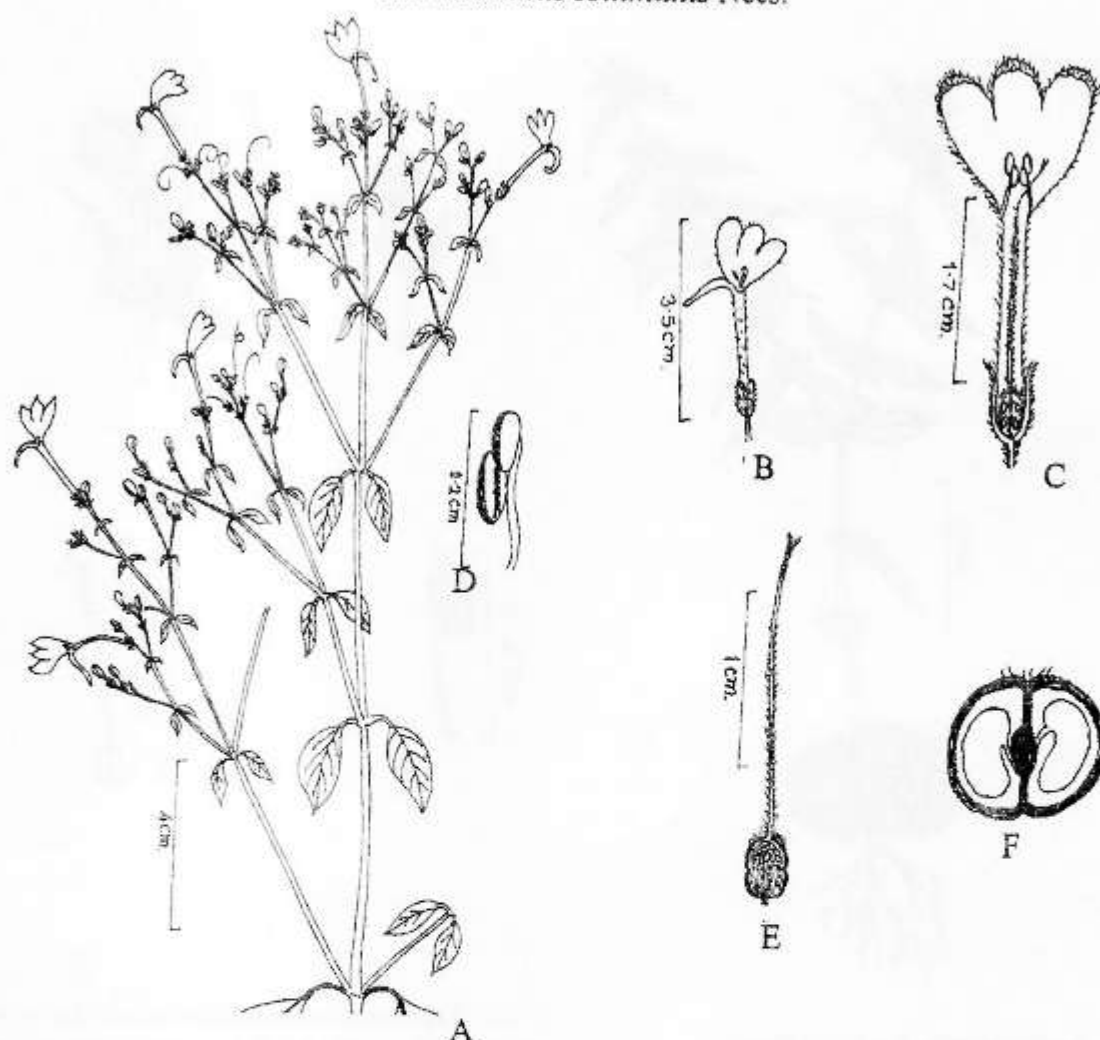
**Flrs. & Frts. :-** Sept. - Nov.

**Locality :-** Kelapani & along roadside from Harisal to Kolkaz.

**Exsiccata :-** VDD 209.

# ACANTHACEAE

*Rhinacanthus communis* Nees.



A - Habit sketch, B - Single flower, C - L.S. flower,  
D - Single stamen, E - Gynoecium, F - T.S. Ovary.

*Rhinacanthus communis* Nees. Hook Fl.B.I.4:541; Watt, Dict. Econ. Prod.6(1):438. *Justicia nasuta*, Linn. Sp. pl. (1753) p.16; Grah. Cat. 164.

Shrubby straggler 8-5 ft. high, stems quadrangular, covered with cottony tomentum. Leaves opposite, linear lanceolate, entire, acute, sparsely hairy, narrowing down into short stalks. Inflorescence, axillary dichotomous, branched cyme; bracts 2, small, green, glandular hairy, 0.2-0.3 cm. Flowers sessile or shortly pedicellate, 2-3 together in terminal panicles. calyx 5-parted upto base, glandular hairy; glands comparatively larger than other parts, 0.4-0.5 cm; corolla 2-3.0 cm. long, white, hairy outside, bilipped, tube long, narrow, 2-2.5 cm; upper lip linear ablong, sharply bifid, extremely narrow, 1x0.2 cm; lower lip broad, 3-lobed, 1.4 x 1.8 cm, white with few dotted lines on central lobe towards base. Stamens 2, inserted on throat of corolla lobe, filaments glabrous; anthers 2-celled, cells muticous, at two different levels. Ovary 2-celled, glabrous, ovules 2 in each cell; style hairy; stigma minutely 2-fid; capsules not seen.

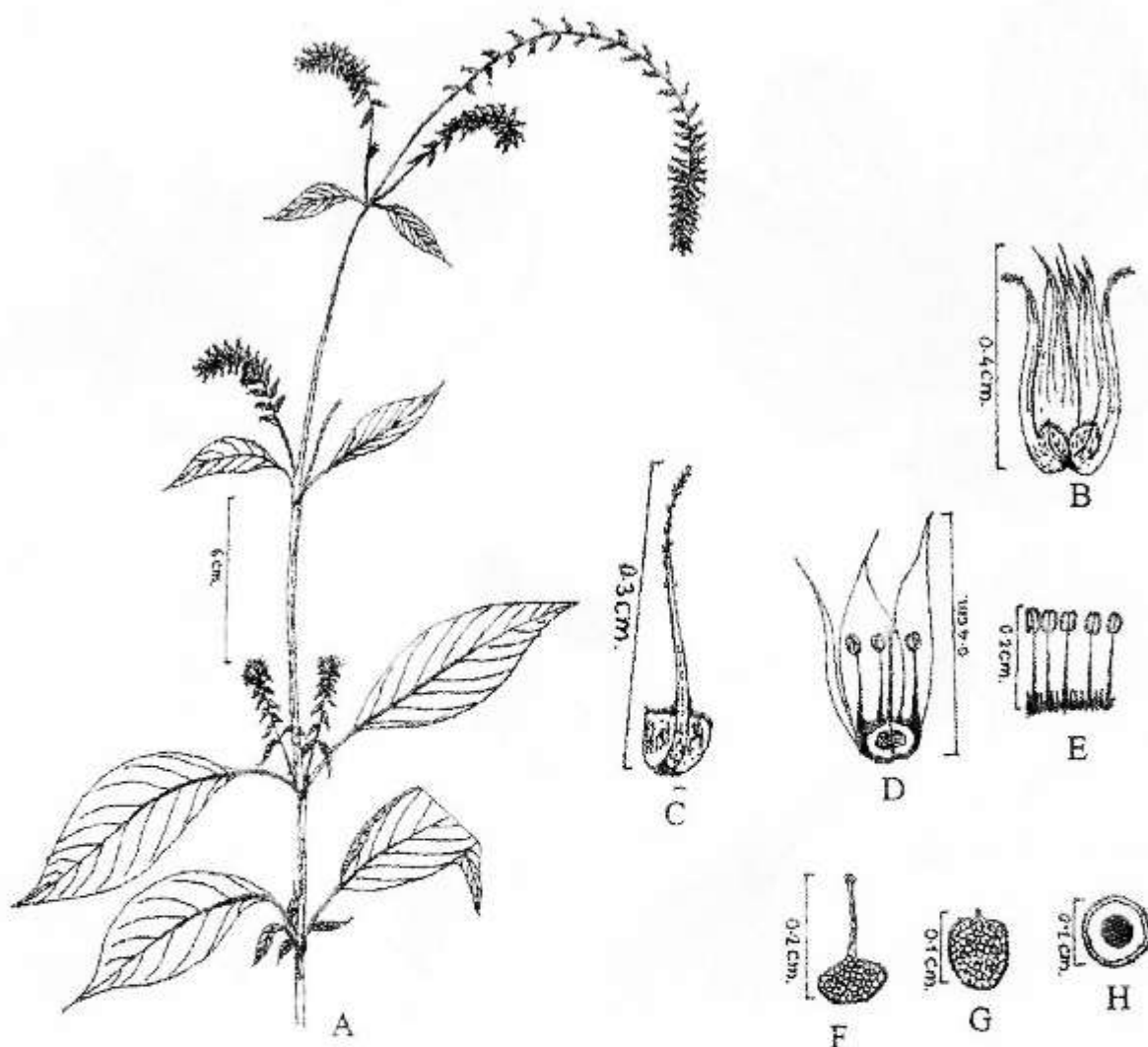
Flrs. & Frts. :- Jan. - Feb.

Locality :- Nabab Nala near Ghatang.

Exsiccata :- PYB. & VDD. 347

First record for Vidarbha.

**AMARANTHACEAE**  
*Achyranthus coynei* Santapau.



A - Habit sketch, B - Single flower, C - Bract,  
D - L.S. Flower, E - Androecium, F - Gynoecium,  
G - Fruit, H - T.S. Ovary.

*Achyranthus coynei* Santapau. in Kew Bull.  
1948: 488, 1949.

Erect herbs, growing upto 1 1/2 to 2 ft. glabrous; stems quadrangular, purplish. Leaves petiolate, narrowly lanceolate, glabrous, purplish. Spikes axillary as well as terminal all purple red. Flowers bracteate; bracts as long as perianth; tips spinous, hairy; bracteoles two, short, orbicular - ovate, ciliate. Perianth of 5 tepals, free upto base, acute purple. Stamens 5, united to form a cup below; filaments and cup rose - purple, glabrous; anthers yellow. Ovary subglobose, puberulous. Fruit polished, surface tubercled.

**Flrs. & Frts. :-** Sept. - Nov.

**Locality :-** Makhala.

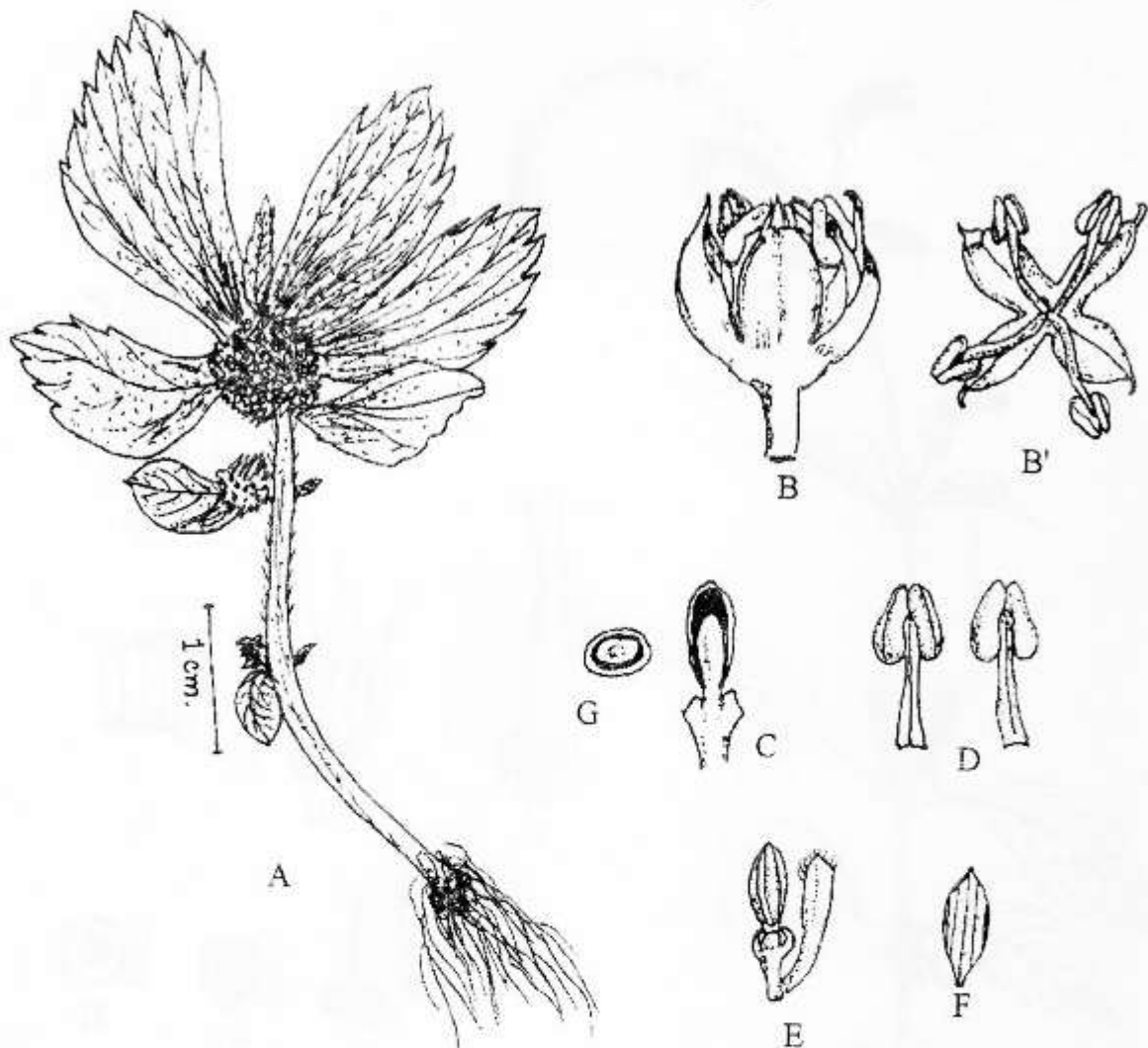
**Exsiccata :-** PYB. & VDD. 348.

Rare. Only one population of few plants. Collected only once by Santapau from Khandala. Listed as endangered species in Red Data Book (BSI. 1988.). First recored for Vidarbha.



# URTICACEAE

*Elatostemma surculosum* Wight.



A - Habit sketch, B. & B' - Male flower,  
C - Female flower, D - Stamen, E - Gynoecium, F - Fruit.

*Elatostemma surculosum* Wight.Hook.  
Fl.B.I.5:572, Math-IU.F1. of Palni Hills p.657.  
1996. Mukherjee Fl. Pach. & Bori Res.p.279.  
1984.

Small herbs, 5-6 cm; stem succulent, hairs in two rows along the stem, decurrent with leaf. Leaves alternate, subsessile, oblique and inequilateral, 3-nerved from the base with small stipule like appendage opposite the leaf. Flowers minute, crowded in unisexual involucre sessile heads. Involucral bracts ablong, obtuse, free, connate at their bases in a fleshy circular disc; bracteoles densely crowded, those of male heads usually ablong and that of female heads spatulate. Flowers tetramerous; Male flowers with tepals acute curved mucronate; stamens 4, opposite the perianth. Female flowers smaller than male; perianth obtuse; achene ellipsoid, acute, ribbed; seeds ellipsoid, glabrous.

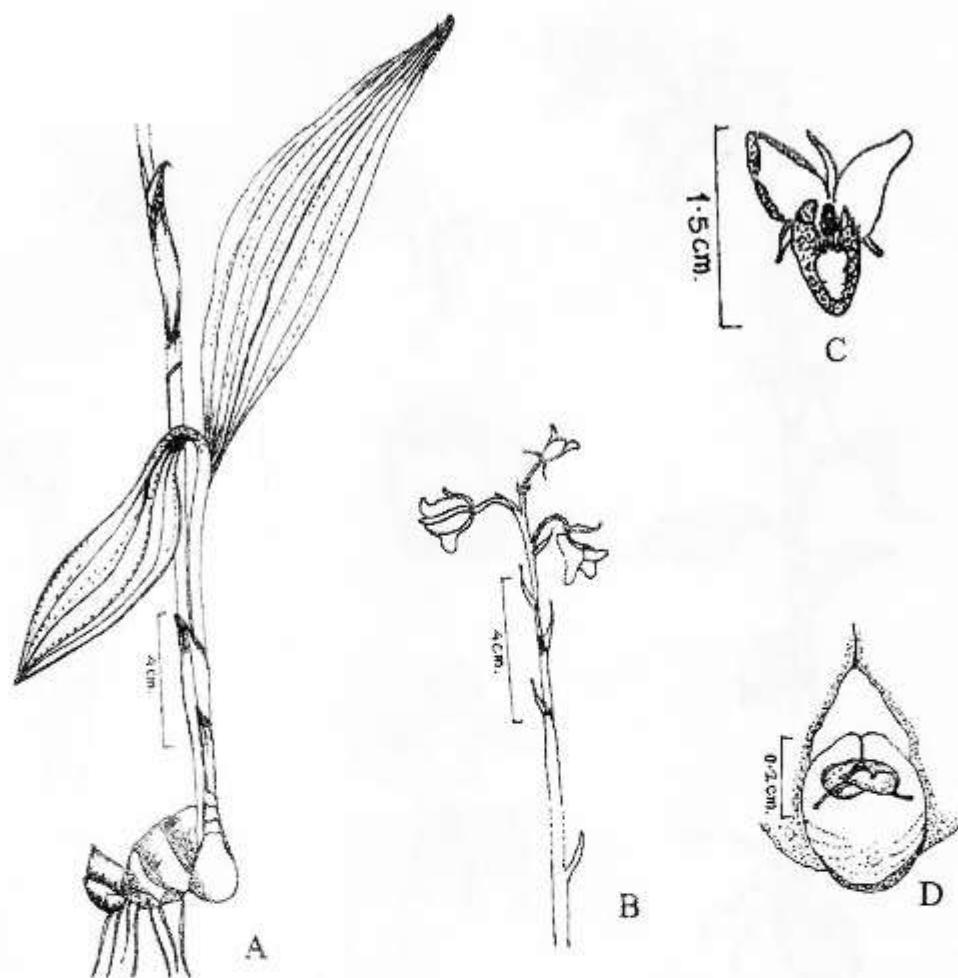
Flrs. & Frts. :- Sept. - Nov.

Locality :- Semadoh Tourist Complex.

Exsiccata :- PYB. 349

Plants grow in the crevices of walls. First record for Maharashtra.

**ORCHIDACEAE**  
*Eulophia pratensis* Lindl.



A - Habit sketch (without scape), B - Scape with flowers,  
C - Flower in surface view, D - Column with Pollinia.

*Eulophia pratensis* Lindl. Hook.  
F l . B . I . 6 : 4 : Fyson . F l . South . 2 n d .  
Illustrations . 1 : 576 . 1932.

Plants pseudobulbous; bulbs obconical, snail shell like with oblique, annular rings on surface; in long chains. Leaf & scape appears separately. Leaves 2-5, arising from the base of the bulb, elliptic-lanceolate, aerial axis a pseudostem formed of leaf bases; lower 4-5 leaves sheath like, closely clasping the petiole of laminar leaves; laminar leaves 25 x 6-8 cm, plicate. Scares with broad, loose ochreate sheaths; flowers 3-5, racemosely placed at the top of the scape; bracts becoming smaller towards the apex of scape. Floral bracts linear, equalling the sepals; sepals 3, subequal, elliptic, 5-7 nerved; lateral sepals 1.2 x 0.3 cm, dorsal 1 x 0.3 cm, acute. Petals yellow, lip with faint purple tinge, 1.2 x 0.6 cm with small basal inflaxed lobes embracing lateral petals 1.3 x 0.6 cms. Column with foot; apex entire obtuse; sides slightly winged, the column thus appearing deeply grooved; pollinia 2, with elastic caudicles, attached to rostellum, globose. Capsule 1- 1.5 inches, narrow, loosely twisted.

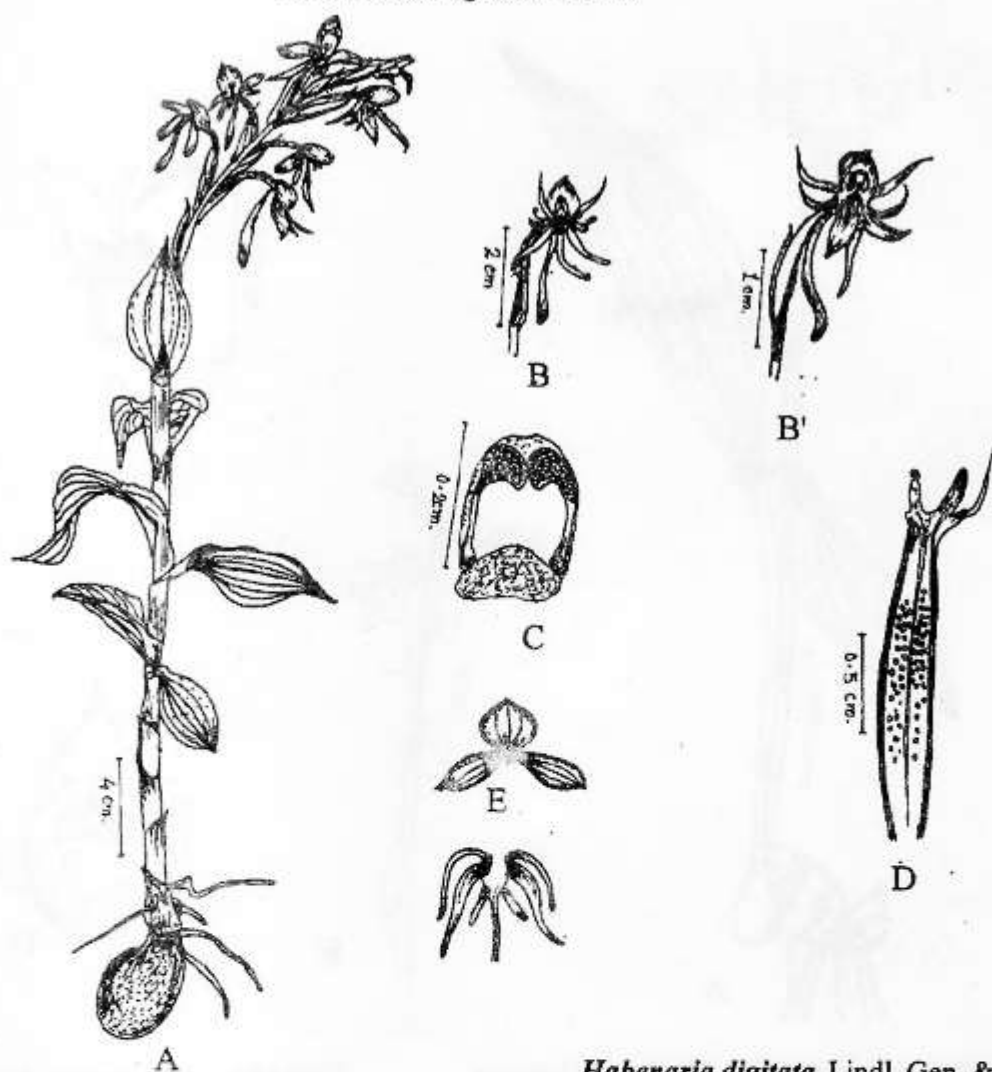
**Flrs. & Frts. :-** July - Aug.

**Locality :-** Core area between Chikhaldara-Semadoh, along moist, humus rich slopes.

**Exsiccata :-** PYB. & VDD. 310.

First record for Maharashtra. Associated with *Curcuma* & *Bamboo*. Hooker notes distribution on Deccan peninsula from Kokan southwards.

ORCHIDACEAE  
*Habenaria digitata* Lindl.



A - Habit sketch, B & B' - Single flower,  
C - Pollinia, D - L.S.Ovary, E - Sepals & Petals.

*Habenaria digitata* Lindl. Gen. & Sp. Orchid (1835) p. 307. Fl. B.I.6:134; Dalz & Gibs. p. 267; Prain, Beng. Pl. p.1030. *H. Gibsoni*, Hook. Fl.B.I.6 (1890) 135; Woodr. in Journ.Bomb. Nat. v. 12 (1899) p. 519. *H. trinervia*, Weight, Icon. v. 5. part 1 (1852) p. 12, t. 1701.

Herbs. Stem 1-2 ft high, leafy, lower part with closely appressed sheaths. Leaves variable, 6-10 by 2.5 - 4 cm., ovate, oblong, acute, sheathing at the base. Flowers greenish white, in lax racemes; bracts large, lanceolate, acute; pedicels very short. Sepals greenish white; lateral sepals 1 x 1/4 cm., ovate, acute, spreading, dorsal sepal 0.5 by 0.5 cm., broadly elliptic, obtuse, 3 - nerved. Petals 2 - partite; upper segment shorter, narrowly linear. Lip 3 - partite; the segments linear, lateral usually shorter than the middle one. Spur reaching 2 cm. long, equalling the ovary, clubshaped with an erect ligule at the mouth. Stigmatic processes clavate, appressed to the lip. anther cells parallel, the tubes upcurved; rostellum shorter than the anther. Capsule oblong, beaked, 2-2.5 cm. long.

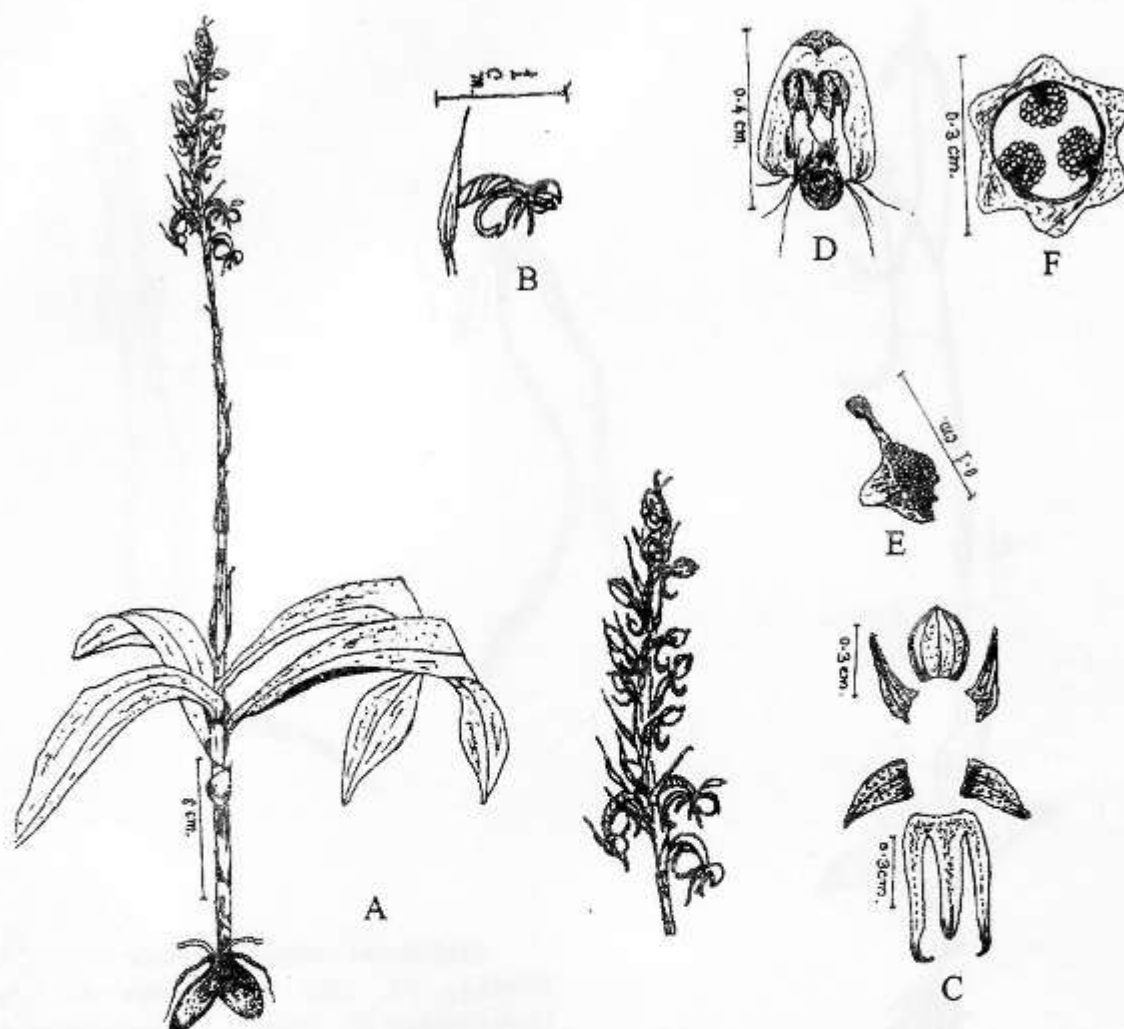
Flrs. & Frts. :- July - Sept.

Locality :- Makhala and core area of the Melghat Tiger Reserve.

Exsiccata :- PYB. & VDD. 305.

# ORCHIDACEAE

## *Habenaria hollandiana* Sant.



A - Habit sketch, B - Single flower, C - Sepal & Petals, D - Pollinia in sacs, E - Single Pollinium, F - T.S.Ovary.

*Habenaria hollandiana* Sant. Fl. Purandhar 126.1958; Sant & Kap. Orch. Bombay 40.1966 *H. affinis* Wight. Ic. t. 1707 1852 non D. Don, 1825; Hook. Fl. B. I. 6: 149. 1890. Cooke, Fl. Pres. Bombay 3: 225; 1958 (Repr. ed.).

Tuberous herbs; tubers 2, oblong ovoid to ellipsoid, 3x1 cm, Basal leaves small sheath like, laminar ones ovate, broadly elliptic lanceolate; 5-12 x 0.5 - 2.5 cm, minutely papillate on margins, inserted near the middle of the stem, upper leaves again small, narrow, sheathing, gradually transformed into bracts. Inflorescence racemose, 3-22 cm, long; peduncle 23-25 cm. long. Flowers dense small, greenish white to green, 1.6 cm long, bracteate, shortly pedicellate. Sepals green, unequal; lateral spreading 3-nerved, some what narrower; middle one broad, ovate, obtuse. Petals entire; lip 3 partite; lateral lobes longer than middle one, acute with slightly incurved at ends. Anther cells parallel; pollinia granular; Capsules 1-1.4 x 0.3-0.4 cm, fusiform, tapering above into a narrow beak.

Flrs. & Frts. :- Aug. - Oct.

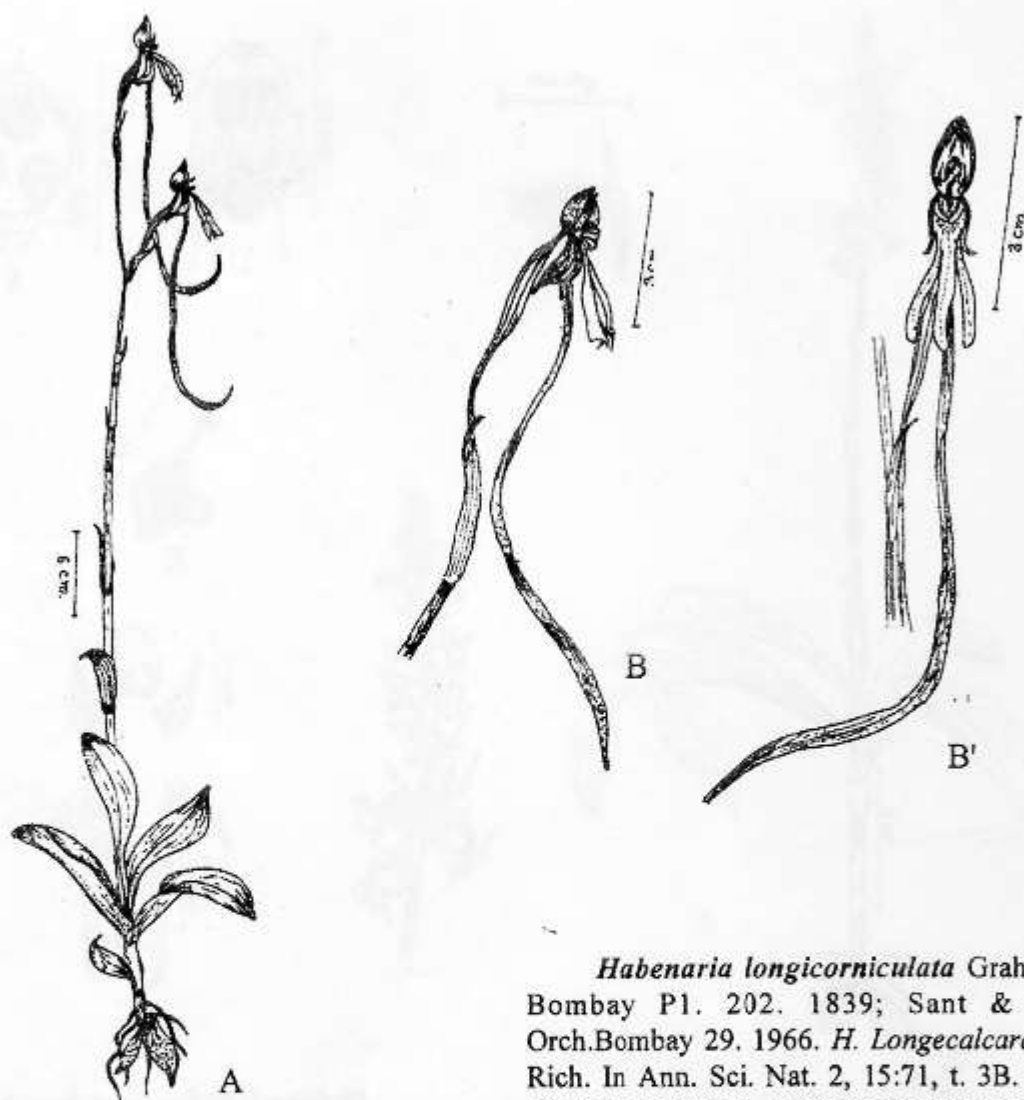
Locality :- Along Masoondi-Semadoh interior road on the bank of small nallah.

Exsiccata :- PYB. & VDD. 350.



# ORCHIDACEAE

*Habenaria longicorniculata* Grah.



A - Habit sketch, B & B' - Single flower.

*Habenaria longicorniculata* Grah. Cat. Bombay Pl. 202. 1839; Sant & Kap. Orch. Bombay 29. 1966. *H. Longecalcarata* A. Rich. In Ann. Sci. Nat. 2, 15:71, t. 3B. 1841; Hook. Fl. B. I 6:141. 1890; Cooke, Fl. Pres. Bombay 3 : 223. 1958 (Repr.ed.) *H. longecalcarata* var. *viridis*, Blatt. & Mc. C. in J. Bombay Nat. Hist. Soc. 36 : 20 1932.

Plant tuberous, 2-3 ft. high or more; stem short, leaves near the base, 3-5, oblong, lanceolate, 1- 4 x 3/4-11/2 inch. Flowers white, fragrant, pedicellate; pedicel 4-5 cm. long, grooved or ribbed like ovary, bract ovate, 3.5 cm. - 4 cm. long, closely sheathing forming a sheathing tube. Sepals 3, all turned to one side, odd sepal conspicuous boat like, 1.2-3 cm. long, broad; lodging within two laterals. Petals 3, all turned to one side. Lip large, trifid, 2.5 cm. long, lateral lobes almost twice as broad as the central lobe, like two lateral petals, unequal ovate. Spur clavate, 13 cm. long the broad portion almost 6-7 cm. Anther tubes long, slender; pollinia narrowly pyriform, shorter than the caudicles, which are narrowly winged on one side. Stigmatic processes thick, surrounding the mouth of the spur. Rostellum obscure.

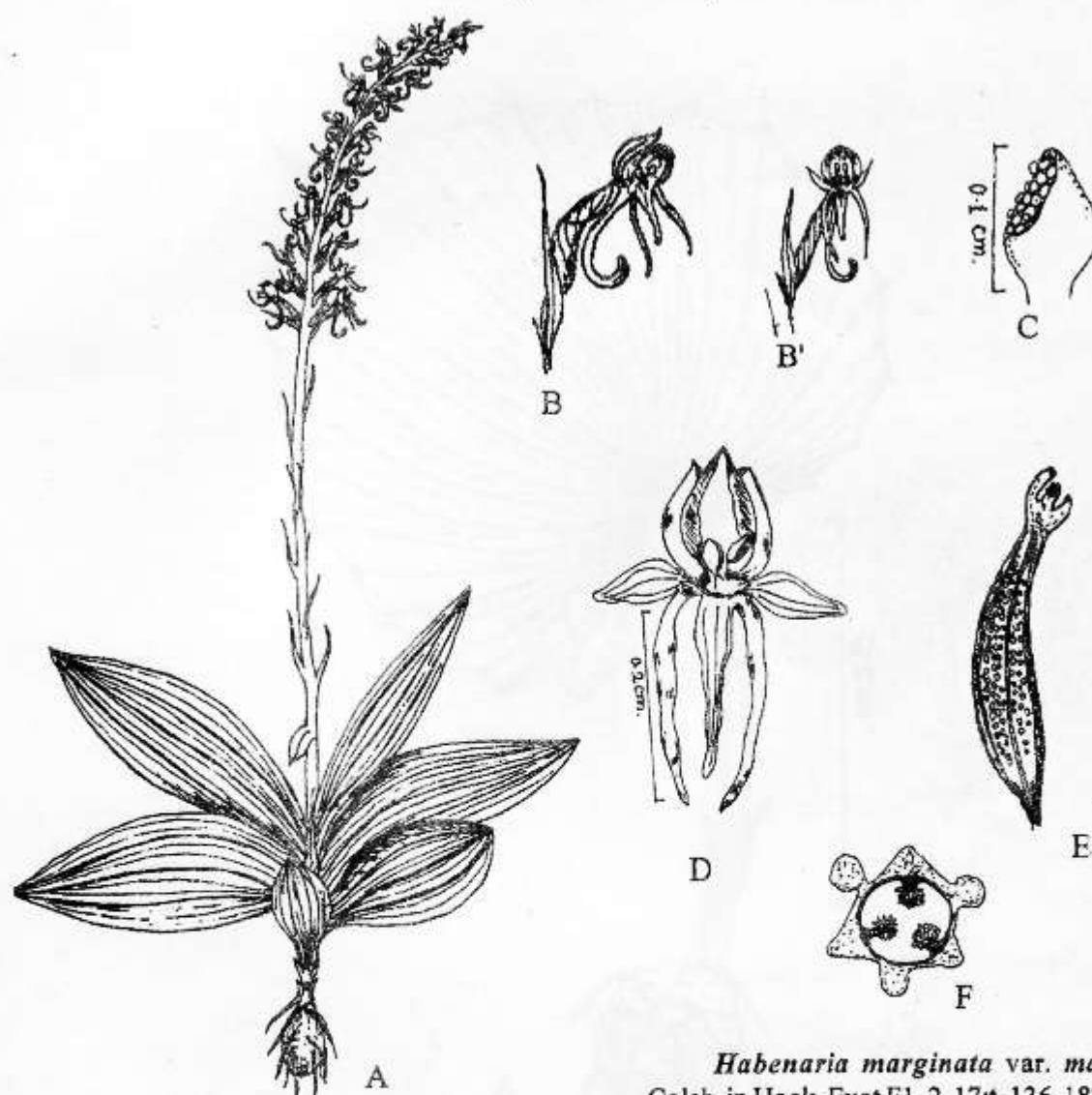
Flrs. & Frts. :- July - Sept.

Locality :- Collected from core area of Melghat Tiger Reserve Forest.

Exsiccata :- PYB. & VDD.326.

# ORCHIDACEAE

*Habenaria marginata* var. *marginata* Coleb.



A - Habit sketch, B & B' - Flower, C - Pollinium,  
D - Sepals & petals, E - L.S.Ovary, F - T.S.Ovary.

*Habenaria marginata* var. *marginata*,  
Coleb. in Hook. Exot Fl. 2, 17:t, 136. 1824; Hook.  
Fl. B. I. 6: 150. 1890; Cooke. Fl. Pres. Bombay  
3: 226. 1958 (Repr. ed. Flora of India ser. 2. Fl. Mah.  
Sta. Monoc. p. 39.

Plants 25-30 cm high. Leaves 3-4, subradical, sessile, 7-9 x 3-5 cm, ovate lanceolate, reduced upwards to lanceolate, finely acuminate 2.5 cm long sheaths. Flower pale green, sessile, in dense cylindrical spikes, 10-13 cm. long; bracts 2-2.5 cm long, ovate-lanceolate, finely acuminate, nearly as long as ovary. Sepals 3 - nerved; dorsal broadly ovate; laterals, some what narrower. Petals entire, oblong - lanceolate, closely appressed to the dorsal sepal. Lip 3- partite; lateral linear, midlobe broader with 3-nerves. Spur as long as ovary, stout, curved, clavate at tip. Anther tubes short, funnel shaped. Capsules curved.

Cooke (1958) describes the flower as yellow and sepals 5-nerved, except these two differences, rest of the details match with the specimen collected from Bhootkhara.

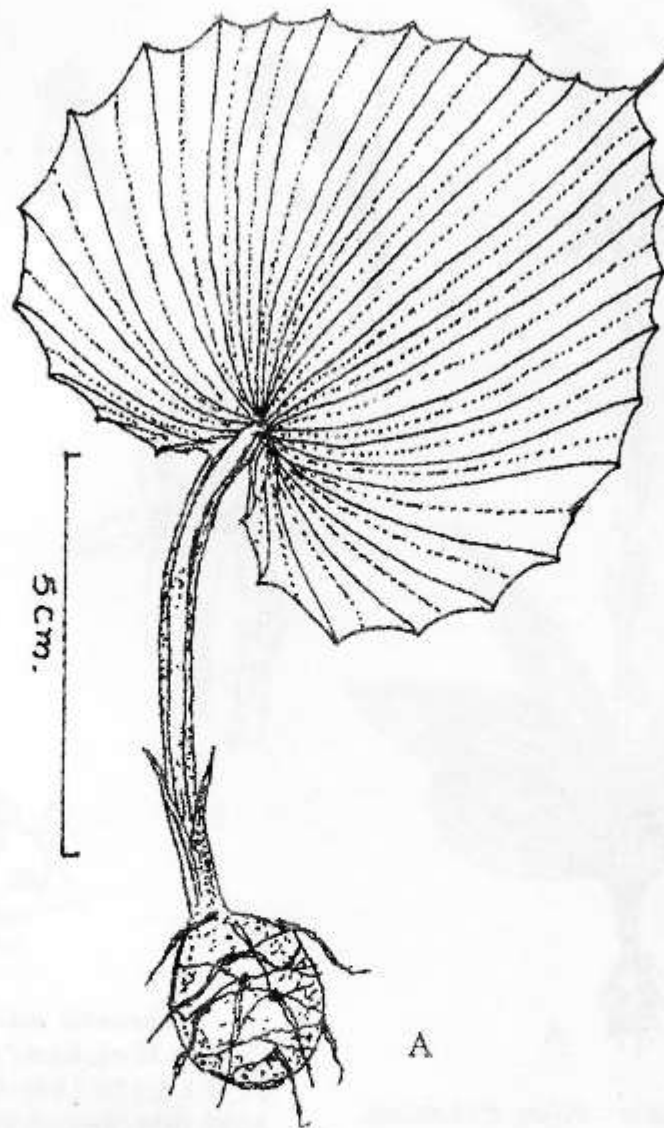
**Flrs. & Frts. :-** Aug. - Sep.

**Locality :-** Bhootkhara.

**Exsiccata :-** PYB 352.

ORCHIDACEAE

*Nervilia aragoana* Gaud.



A - Habit sketch.

*Nervilia aragoana* Gaud. in Freyc. Voy. Bot. 422. t. 35. 1829; Sant. & Kap. Orch. Bombay 134. 1966; Hook. Fl. B. I. 6: 121. 1890; Cooke, Fl. pres. Bombay 3: 211. 1958 (Repr. ed.); Fl. Ind. 2. Mah. St. Monoc. p. 48. 1996.

Tubers 1.5 - 2.0 cm. in diam; subglobose, white. Leaf petiolate, 9 - 12 x 8 - 11 cm, cordate, broadly ovate to almost orbicular, acute, acuminate, nerves upto 20. Flowers not seen. Only vegetative specimens collected.

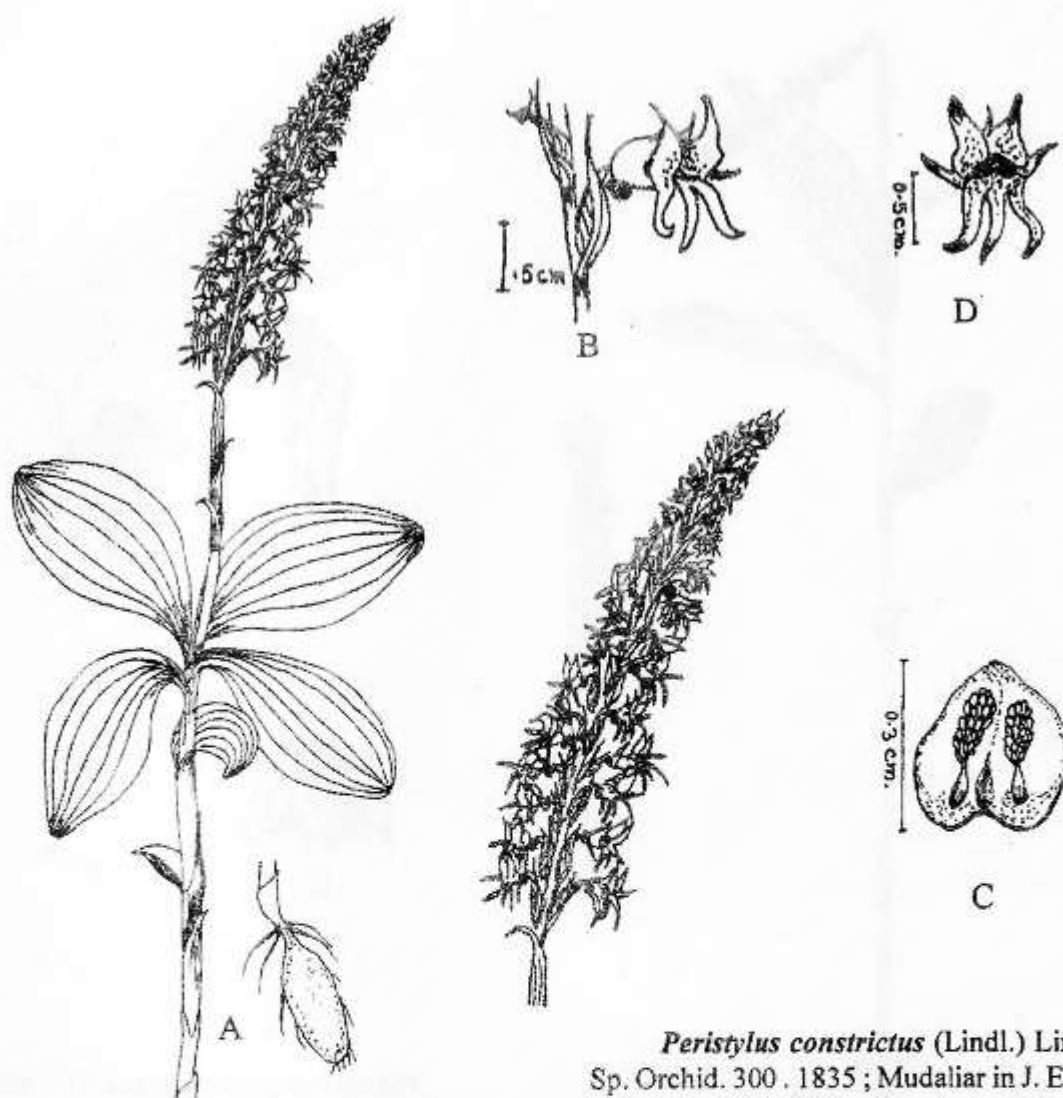
**Season :-** July To August.

**Locality :-** Semadoh, in core area.

**Exsiccata :-** PYB 299.

# ORCHIDACEAE

*Peristylus constrictus* (Lindl.) Lindl.



A - Habit sketch, B - Single flower,  
C - Pollinia, D - Petals.

*Peristylus constrictus* (Lindl.) Lindl. Gen. Sp. Orchid. 300. 1835; Mudaliar in J. Econ. Tax. Bot. 15 : 459. 1991. *Herminium constrictum*, Lindl. in Edw. Bot. Reg. 18 : subt. 1499, 1832. *Habenaria constricta*, (Lindl) Hook Fl.B.I.06: 161.1890.

Terrestrial leafy tuberous herbs, tubers 8x2 cm., elliptic-lanceolate; stem 45-66 cm. high, stout. Leaves inserted on middle of the stem, elliptic, entire, obtuse, base sheathing narrowing into petiole. Spikes densely flowered, cylindric, 10-20 cm. long. Flowers snow white, pleasantly fragrant. Sepals free, lateral 0.8 x 0.2 cm. narrowing towards the apex, dorsal sepal as equal as lateral, obtuse. Petals white; lip 3-lobed 1.3 x 0.4 cm. lateral lobes 0.8 x 0.1 cm; middle lobe shorter than laterals. Column continuous with the ovary. spur much shorter than sepals in the form of 2 globular outgrowths at the base of lip. Pollinia 2, granular with short caudicle. Ovary twisted, 1 x 0.2 cm. Capsules not seen.

**Flrs. & Frts :-** July - Aug.

**Locality :-** Semadoh, in core area.

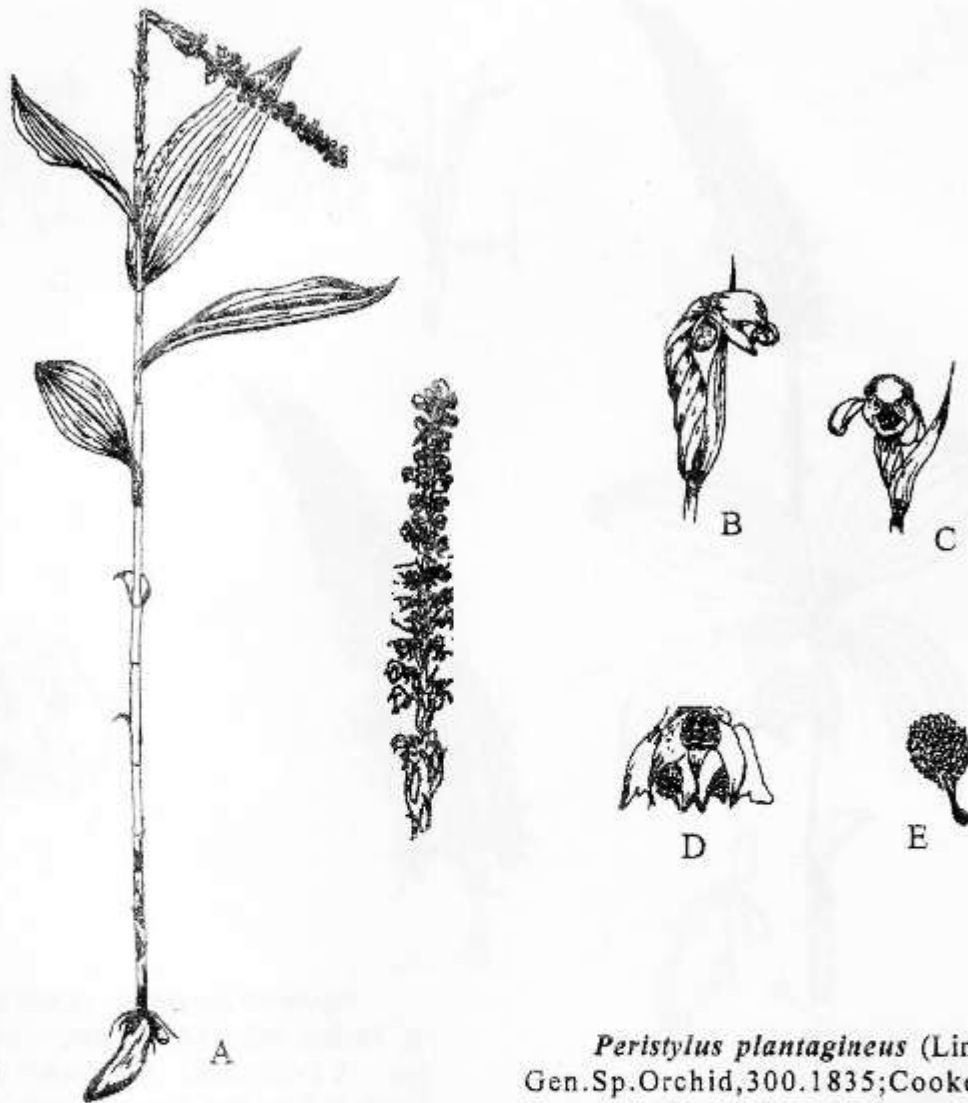
**Exsiccata :-** VDD. 280

Rare. Existence of plant can be detected from distance because of its fragrance. It occurs in East and N.E. India and Himalaya. This represents an discontinuous extended distribution to Maharashtra (Mudaliar, 1991).



# ORCHIDACEAE

## *Peristylus plantagineus* Lindl.



A - Habit sketch, B & C - Single flower,  
D - Pollinia in sacs, E - Pollinium.

*Peristylus plantagineus* (Lindl.) Lindl.  
Gen. Sp. Orchid, 300. 1835; Cooke. Fl. Pres.  
Bomb. 3: 216. 1958. (Repr. ed); Sant &  
Kap. Orch. Bombay 51, t. 10, A-B. 1966 *Habenaria*  
*wightii*, Trim. Cat. Ceyl. pl. 91. 1885. Hook. Fl. B. I.  
6: 162. 1890.

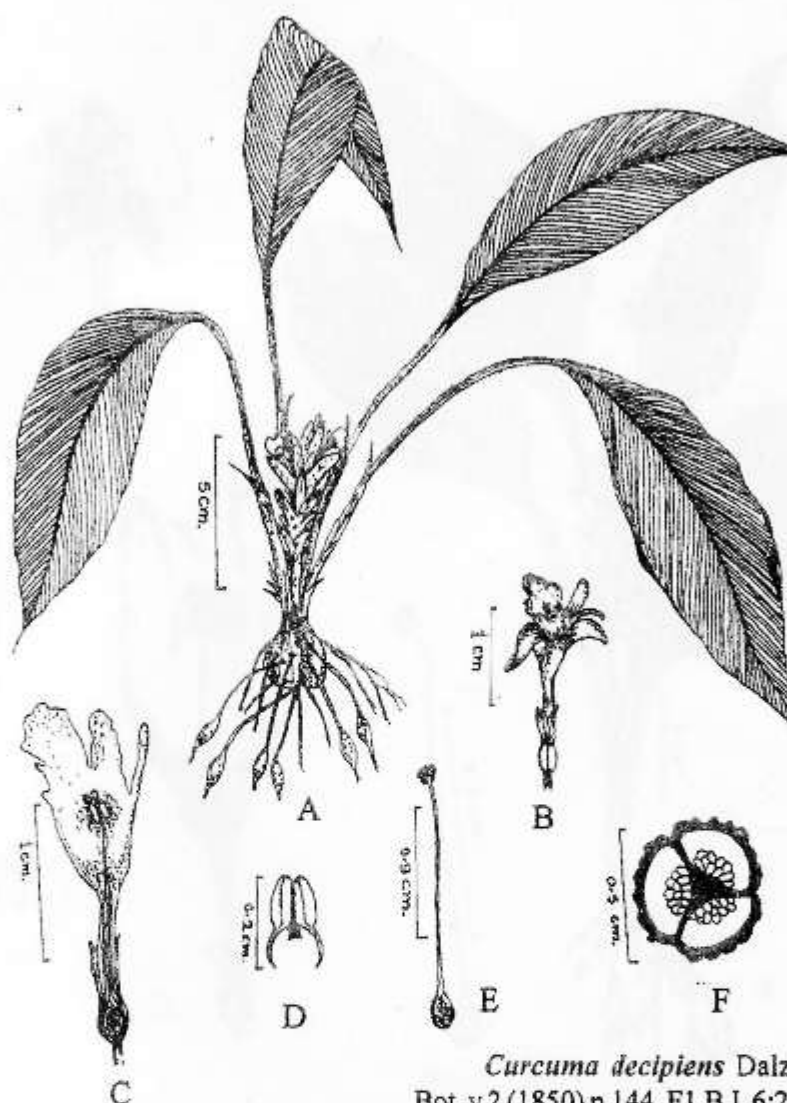
Herbs 60-80 cm high; plants tuberous; tubers 2, oblong, 6-7 cm long. Stems robust, sheathed below leaves. Leaves 17-20 x 4-6 cm long, oblong lanceolate, acute, margins entire, minutely papillose, strongly nerved beneath, closely sheathing at the base. Inflorescence spike, 4-5 cm long, bracts reaching 1.5-2 cm long, erect, narrowly lanceolate, acuminate. Sepals 3, brownish green, obtuse, 0.3-.5 cm. Petals 3 shorter and paler than calyx, white, broad, obliquely orbicular obovate, tips recurved. Lip white, shorter than the sepals, broadly obovate, entire; lobes obtuse; spur in the form of globular gland like body. Anther cells parallel; tubes short; pollinia clavate; caudicles short; glands small. Stigma processes short, stout. Rostellum short acute. Fruit not seen.

**Flrs & Frts :-** July - Sept.

**Locality :-** Masoondi to Semadoh road, in core, along the slopes of nallah.

**Exsiccata :-** PYB.352.

**ZINGIBERECEAE**  
*Curcuma decipiens* Dalz.



A - Habit sketch, B - Single flower, C - L.S. flower,  
D - Stamen, E - Gynoeceium, F - T.S. Ovary.

*Curcuma decipiens* Dalz. in Kew Journ. Bot. v.2 (1850) p.144. Fl.B.I. 6:215; Dalz. & Gibs. p. 274; Woodr. in Journ. Bomb. Nat. v.12 (1899) p. 520; k. Schum. in Engler, Pflanzenreich, v.4, part 46 (1904) p.105.

Root stock bearing numerous almond-like tubers, white inside at the ends of fibers, but with no sessile tubers. Leaves 6-8 x 3-5 inches, broadly elliptic, shortly deltoid - acuminate, membranous, green usually glabrous, base subcordate; petioles as long as the leaf. Flower purple, in aestival spikes 2.5 - 3 in long; flowering bracts, 1 inches long, ovate, obtuse, acute, purple, Calyx 1.5 inches long, obtusely toothed, puberulous near the base. Corolla purple; tube twice as long as the calyx; lobes oblong lanceolate. Lip obovate, 2 fid, with curled margins. Stamen 1, perfect; filament short; anther with contiguous cells spurred at the base; lateral staminodes oblong, petaloid connate with the filament. Ovary 3-celled; ovules numerous on axile placenta; style filiform; stigma 2-lipped, lips papillate.

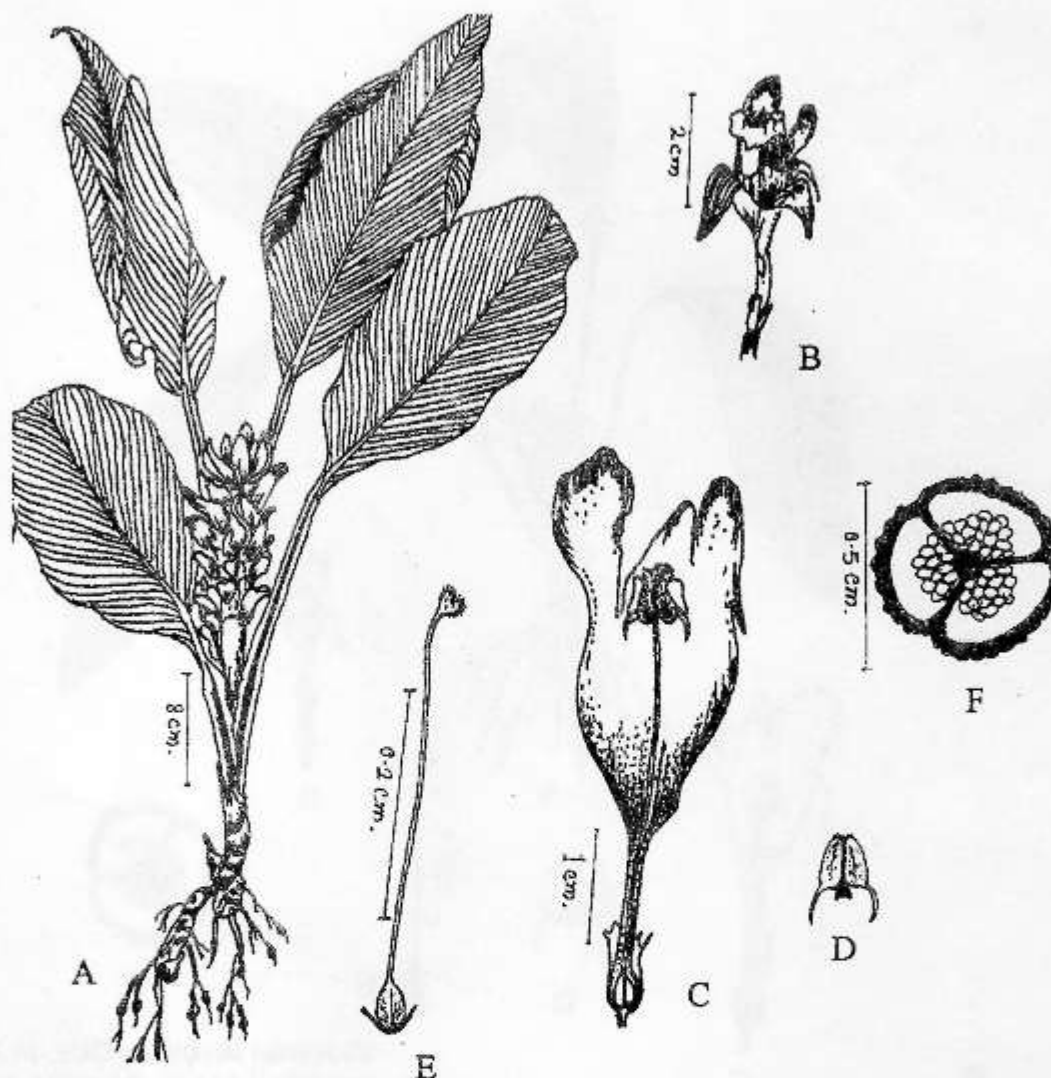
**Flrs. & Frts. :-** Aug. - Nov.

**Locality :-** Masoondi-Semadoh interior road.

**Exsiccata :-** VDD. 276.

Apparently endemic to W. Peninsula.

**ZINGIBERACEAE**  
*Curcuma inodora* Blat.



A - Habit sketch, B - Single flower, C - L.S. flower,  
D - Androecium, E - Ovary, F - T. S. Ovary

*Curcuma inodora* Blat. in J.as.Soc.Beng. (N.S.)26:357. 1930; Sant.in J.Bombay. Nat. Hist.Soc.51:135. 1952. Lakshminarsimhan, Fl.Nashik Dist.p.457.1991.

Herbs, perennating by tubers. Leaves radical, narrowing down into long petioles, 15-30 by 5-15 cm, lamina broadly elliptic-lanceolate. Inflorescence comose spike; bracts rosy pink with purple tips, 2-35 cm. long, ovate, obtuse. Calyx short 1/2 -1 cm, minutely toothed. Corolla red orange, tube funnel shaped, twice as long as calyx, lobes oblong lanceolate. Dark yellow spot on labellum. Perfect stamen 1, ;filament short, anther cells spurred at the base; lateral staminodes oblong, petaloid, connate with the filament. Ovary 3 celled;ovules numerous on axile placentas; style filiform;stigma 2 - lobed. Capsules 3-valved with arillate seeds.

**Frts. & Frts. :-** Aug. - Nov.

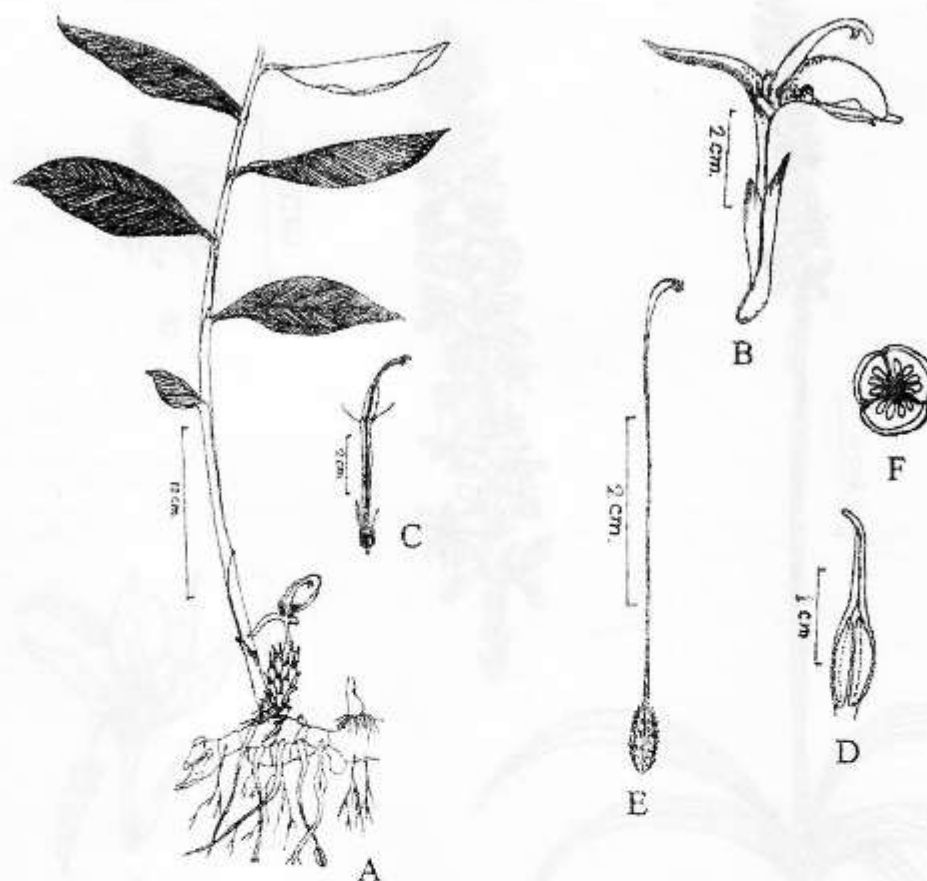
**Locality :-** Most common in Melghat.

**Exsiccata :-** PYB. 208.

Locally known as 'Bedi Halad'. Variant of *C. inodora* observed had densely comose spike with bracts narrow and horizontally spreading. Diameter of spike was almost 1 1/2-2 times of the normal ones.

## ZINGIBERACEAE

*Zingiber nimmonii* (Nimmo). in Dalz. & Gibs.



A - Habit sketch, B - Single flower, C - L.S. Flower,  
D - Single stamen, E - Gynoecium, F - T.S. Ovary.

*Zingiber Nimmonii* (Nimmo). in Dalz & Gibs Bo. Fl. p.273), Dalz. in Kew Journ. Bot v.4(1852) p. 341. Fl. B.I. 6 : 244; Dalz & Gibs p. 273; Woodr. in Journ. Bomb. Nat.v.12 (1899) p. 521; k.Schum. in Engler, Phanzenreich, v.4, part 46 (1904) p. 184. *Alipinia nimmonii* Grah. Cat.Pl.Bo.(1839) p. 206.

Herbaceous tuberous plants; tubers horizontal,; stem leafy, 4-6 ft high reddish-green, glabrous. Leaves oblong lanceolate, 6-12 x 2-4 in, acute at base and acuminate at apex, green, pubescent beneath; petioles short, hardly 2-3 cms, sheathing, ligulate; ligules 1.5 -2 cm, truncate. Inflorescence spike, hardly coming out of the soil, red, 3-4 inches long. Flowers subsessile; bracts linear lanceolate, 3-4 cm long finely acute, red, the inner bifid. Calyx tubular, sepals 3, 0.5 -1.5 cms long. Corolla tubular as long as the bracts, 3 lobed; lobes lanceolate reddish yellow. Lip 3-lobed, yellow; midlobe round ovate, emarginate; side lobes rounded. Stamen 1, perfect; filament short; anther 2 - celled; connective produced over the anther cells, beaked, adnate to the lip. Ovary 3 celled, ovules many, placentation axillary; style filiform; stigma small, subglobose, papillate hairy. Capsules not seen.

**Flrs & Frts :-** July - Aug.

**Locality :-** Vegetative specimen were collected by Dr. V.A.Ghurde from Melghat. Flowering plant procure from his garden. Outside Konkan, first report for Maharashtra.

**Exsiccata :-** PYB. 336.



**LILIACEAE**  
*Chlorophytum glaucum* Dalz.



A - Habit sketch, B - Single flower, C - L.S. flower.

*Chlorophytum glaucum* Dalz. in Hook.  
Kew J. Bot. 2:142. 1850; Hook. Fl. B. I. 6:334  
1892. Cooke, Fl. pres, Bombay 3:280. 1958  
(Repr.ed)

Herbs with many, fascicled, tuberous roots; root fibers cylindric. Leaves 5-8, 12-18 x 1-2 inches., narrowly oblanceolate, acute, glabrous, glaucous. Scape erect, 1-2 ft. long. Flowers few, arranged in cymose pairs, in dense 6-12 x 1 inches long racemes; bracts linear, acute, almost 1.5 cm. long, persistent; flowers white; tepals broad, lanceolate, 5-nerved. stamens 6, 0.8 cm long; filaments short, 0.2 - 0.3 cm, minutely papillose; anthers long, 0.5 - 0.6 cm, yellow, Ovary 3 celled, ovules 2 per locule. Style 1/3 in., long, curved; stigma minute. Capsules globose, emarginate, sharply 3-winged. Seeds orbicular compressed, black, not papillose.

**Flrs. & Frts.** :- July - Aug.

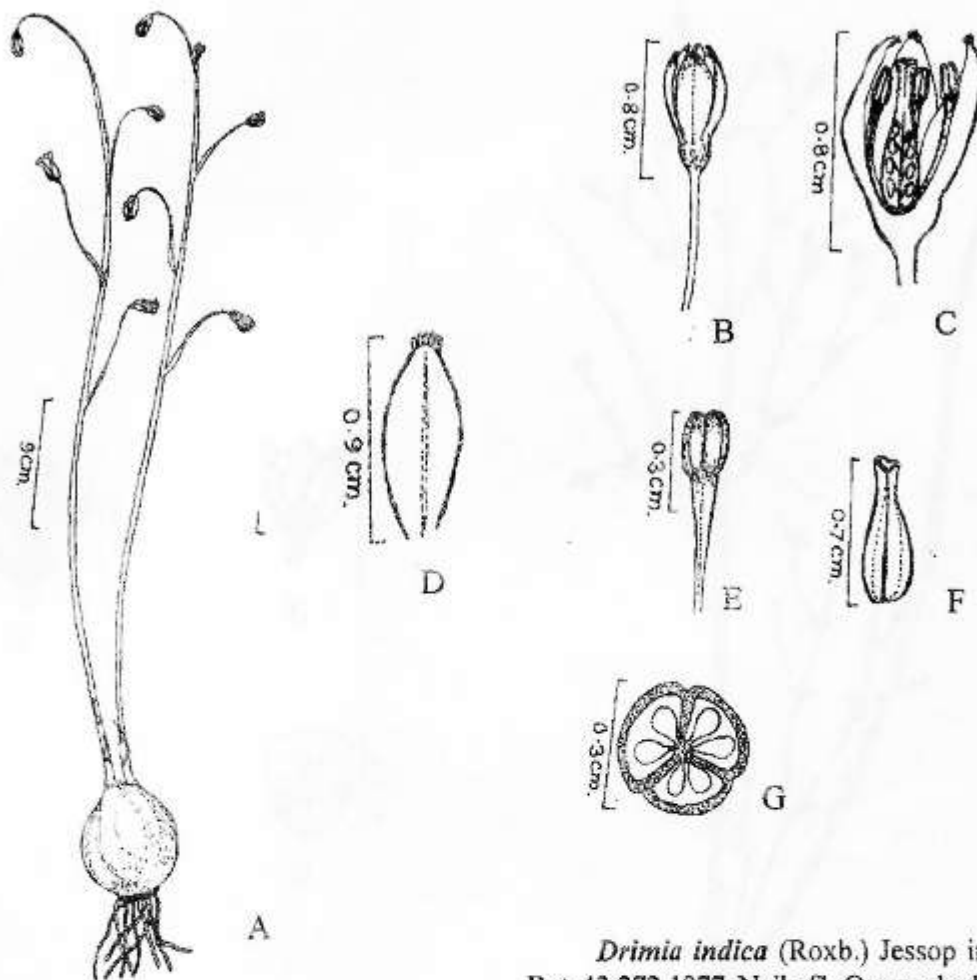
**Locality** :- Dhargad, Gullarghat.

**Exsiccata** :- PYB. 224.

First report for Vidarbha. Some flowers showed long anthers while some showed anthers that coiled after dehiscence. It is possible that androecium is dimorphic or in some flowers, stamens are sterile, so they remain upright in others they are fertile, pollens are shed and dehiscent, anthers get curled.

## LILIACEAE

*Drimia indica* (Roxb.) Jessop.



A - Flowering scape, B - Single flower, C - L.S. Flower,  
D - Single tepal, E - Single stamen,  
F - Gynoecium, G - T.S. Ovary

*Drimia indica* (Roxb.) Jessop in J.S. Afr. Bot. 43:272.1977; Naik, fl. Osmanabad 336.1979. *Scilla indica* Roxb. Fl. Ind. 2: 147. 1832. *Urginea indica* (Roxb) Kunth. Enum. 4:333.1843; Hook. Fl. B. I. 6: 347.1892; Deb et Dasgupta in Bull. B of. Surve Indka. 16:118.1974 et. in fase. Fl. Ind. 7: 17.1981. Naik. Fl. Marathwada 2:864. 1998

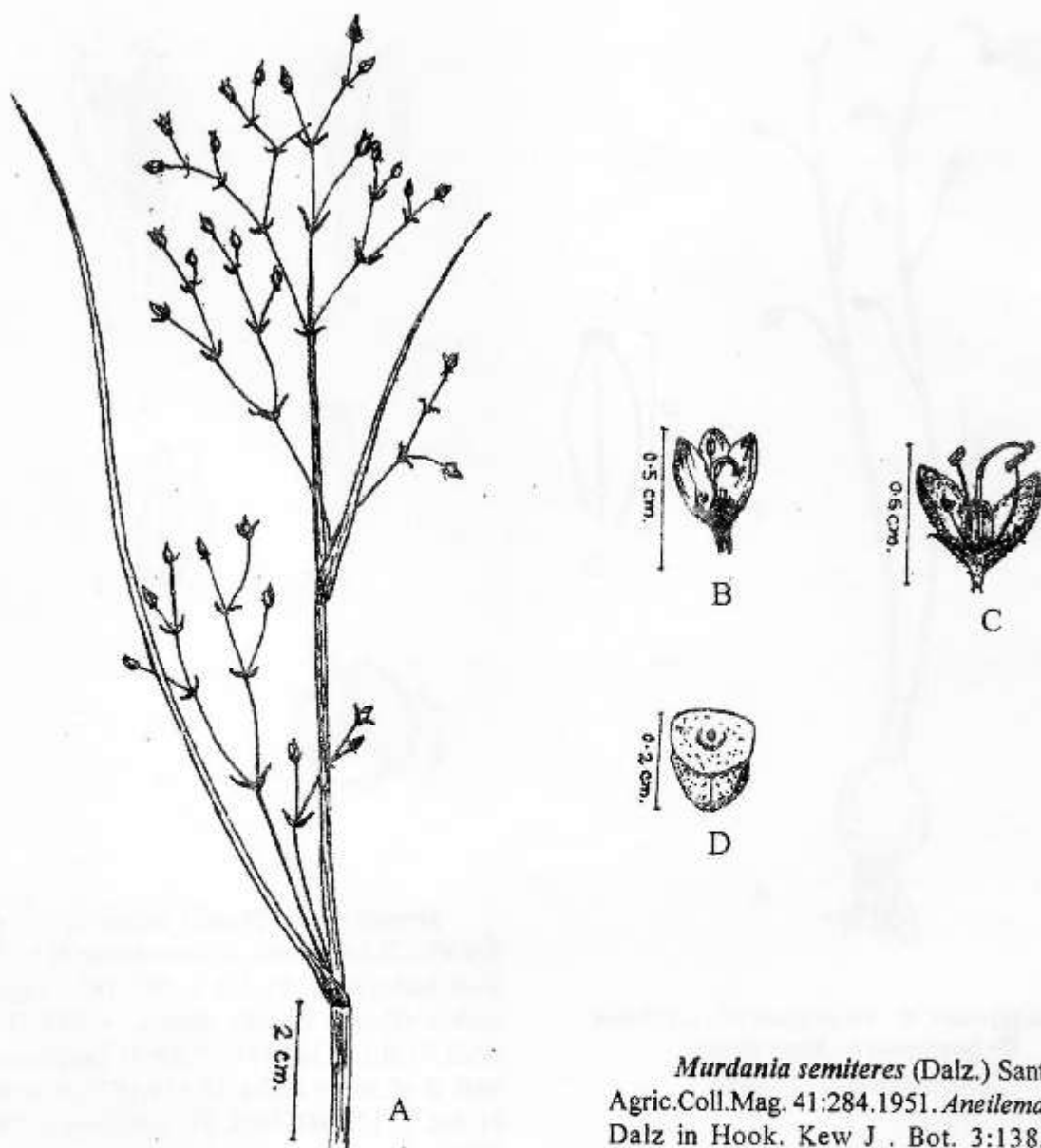
Perennial herb with white underground bulb; bulb 7 x 5 cm. globose with concentric fleshy leaves; leaves linear 13 - 30 x 0.6-2 cm. often curled. Leaves & scapes appear at different times, 15-100 cm. tall, simple; racemes 12-60 cm. long 6 - 15 flowered. Flowers 0.8-1.5 cm, bracteate; bracts thin, membranous, small, 1-2 mm. falling off early; pedicels 5 cm long, filiform but erect. Tepals 6; 3 outer and 3 inner, greenish white with green midrib, oblong - lanceolate, 0.9 - 1.5 cm. long, tuft of bristle like papillae at the tip. Stamens 6, dorsifixed, shorter than the tepals, 0.4 cm, filament as thick anther cells at the base of anther cells. Ovary ovoid, trilocular; 2 ovules per locule; placentation axile; style almost lacking; stigma trilobed. Capsules ellipsoid 7 - 15 by 3 - 0 mm. brownish. Seeds 10 - 20, discoid, 3 - 6 mm. long. black, narrowly winged.

**Flrs. & Frts. :-** Feb. - May.

**Locality :-** Harisal.

**Exsiccata :-** PYB. 240

**COMMELINACEAE**  
*Murdania semiteres* (Dalz.) Sant.



A - Habit sketch, B - Single flower,  
 C - L.S. flower, D - Seed.

*Murdania semiteres* (Dalz.) Sant in Poona Agric. Coll. Mag. 41:284.1951. *Aneilema semiteres* Dalz in Hook. Kew J. Bot. 3:138.1858. *A. paniculatam*. Wall. ex. C.B. Cl. in DC. Monog. Phan. 3:215.1881. non wight 1853; Hook. Fl. B. I. 6:351, 1892; Cooke Fl. Pres. Bombay 3:300. 1958 (Repr.ed).

Herbs 8-20 cm high. Stem green to dark purple. Leaves grasslike, thick narrow, linear; lower 17 x 2 mm whereas upper ones 10-11 x 1 mm, finely acuminate, margin distinctly puberulus. Inflorescence of paniculate cymes. Flowers violet-blue; perianth 6; outer 3 narrow, reddish; inner three broad, 4-5 x 1-1.5 mm, spatulate. Fertile stamens 3, filaments glabrous, staminodes 2. Ovary pink, trigonous, 3 celled all cells fertile; style curved, 4-5 mm long; stigma capitate. Capsules 0.2 cm long, ellipsoid, smooth; ovules in two rows, 6-8 in each locule. Seeds pentagonal, narrowing to the base; seed coat finely warty.

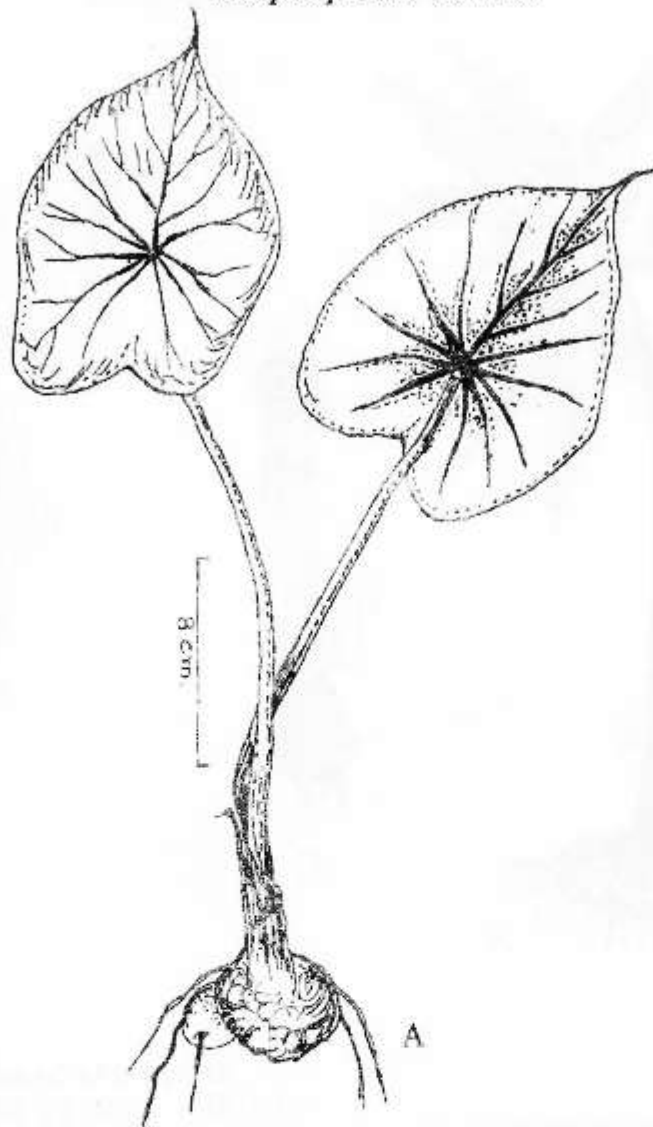
Flrs & Frts :- July-Sept.

Locality :- Masoondi - Semadoh road.

Exsiccata :- VDD.6

ARACEAE

*Ariopsis peltata* Nimmo.



A - Habit sketch.

*Ariopsis peltata* Nimmo. Grah. Cat. pl. B. (1839) p. 252. Hook. Fl. B.I. 6 : 519; Cooke. Fl. Pres. Bombay. 3 : 338, 1958.

A small plant; tubers small, reddish - orange, with many slender fibrous roots. Leaf solitary or 2, 1-6 in. in broad, membranous, peltate, shallowly cordate, tip rounded or acute; glaucous beneath; petiole 5 - 8 in long, slender. Flowers not seen.

Specimens were indentified as *Ariopsis peltata* as they were growing on trunks of *Ficus racemosa*, Linn. and no bulbiferous branches were produced.

Period of collection - Sept.

Locality :- Makhala plateau.

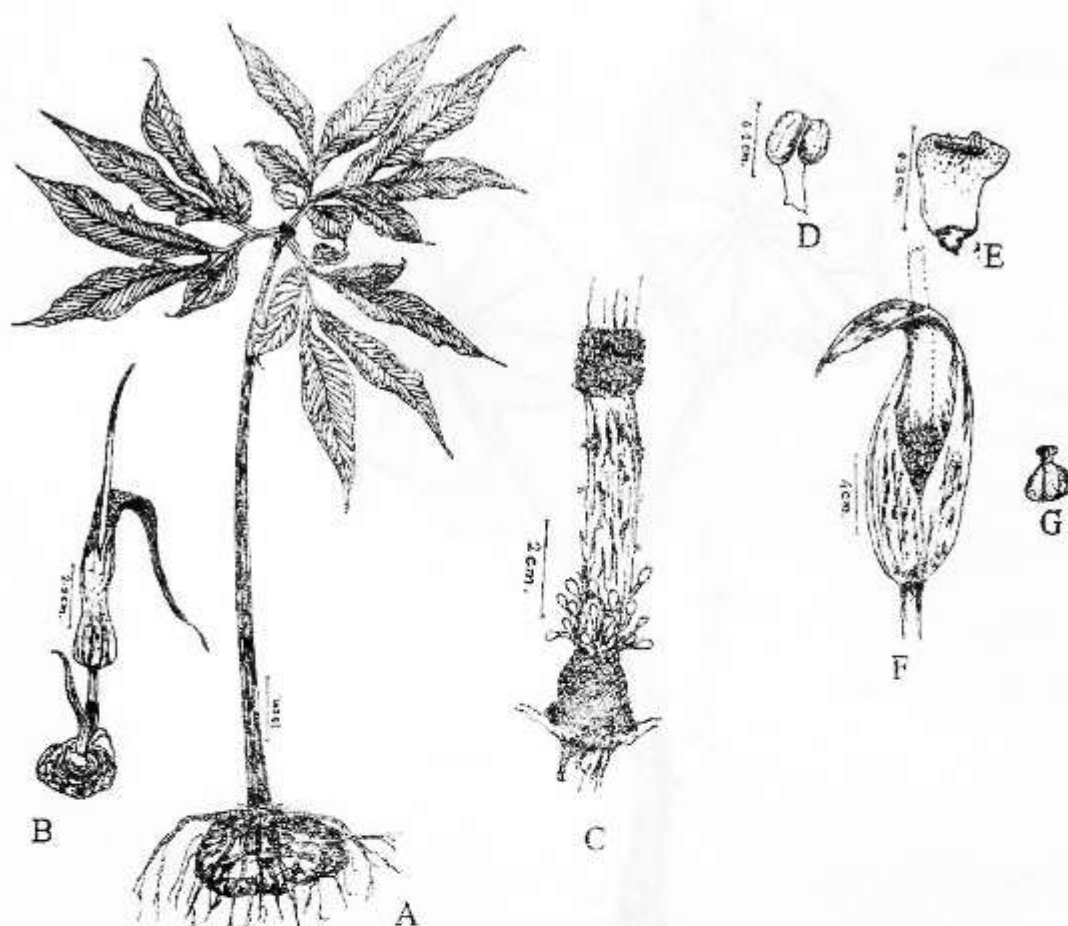
Exsiccata :- PYB. & VDD. 332.

Rare. Observed only once. Since it was not the flowering period for the species only vegetative plant collected. *Ariopsis peltata*, Nimmo & *Remusatia vivipara* (Roxb.) Schott. grow in the hollows of trees and look alike in vegetative condition. *Ariopsis* can be easily identified by absence of bulbiferous branches. (Santapau, 1967.) First report for Vidarbha.



## ARACEAE

*Amorphophallus bulbifer* Blume.



A - Habit sketch, B - Spadix, C - Spathe cut open,  
D - Stamen, E - Ovary, F - Aggregate, G. Single Fruit,

*Amorphophallus bulbifer* Blume, Rumphia  
v.1 (1835). p.148. Fl B.I.6:515; Engler, in C.  
Monog.Phan v.2. (1879)p. 317. Woodr. in Jour.  
Bomb. Nat. v.13.(1901).p.428; *Arum bulbiferum*,  
Roxb. Hort. Beng. (1814) p. 65, Bot. Mag. t. 2072.  
& t. 2508; Grah. Cat.p.229.

Plants cormose; corms large, 2 cm, high and 9 cm, across, some what irregular in shape with regular warts. Roots thick as well as thin; secondary thin roots profuse, concentric wrinkles present on the roots. Leaf single, growing upto 5 ft. high, pedisect; petiole dark green with vertical, long pale green streaks; leaf first divided into three main rachii and each further dichotomy. A bulbil develops at first trichotomy of the petiole, pale green at young stage and brownish black at maturity stage, Spathe 35-40 cm. long, erect, pale pink, shaded with dark pink, rose pink inside. Spadix sessile appendage 20-25 cm long, pale flesh coloured. Male inflorescence reaching 2-3 cm long. Anthers short. Female inflorescence reaching 2-3 cm. long, stigma two lobed. The axis between male & female inflorescences with neuters; neuters yellow, long, globose at the tip, denser near the female inflorescence and thinner towards male inflorescence.

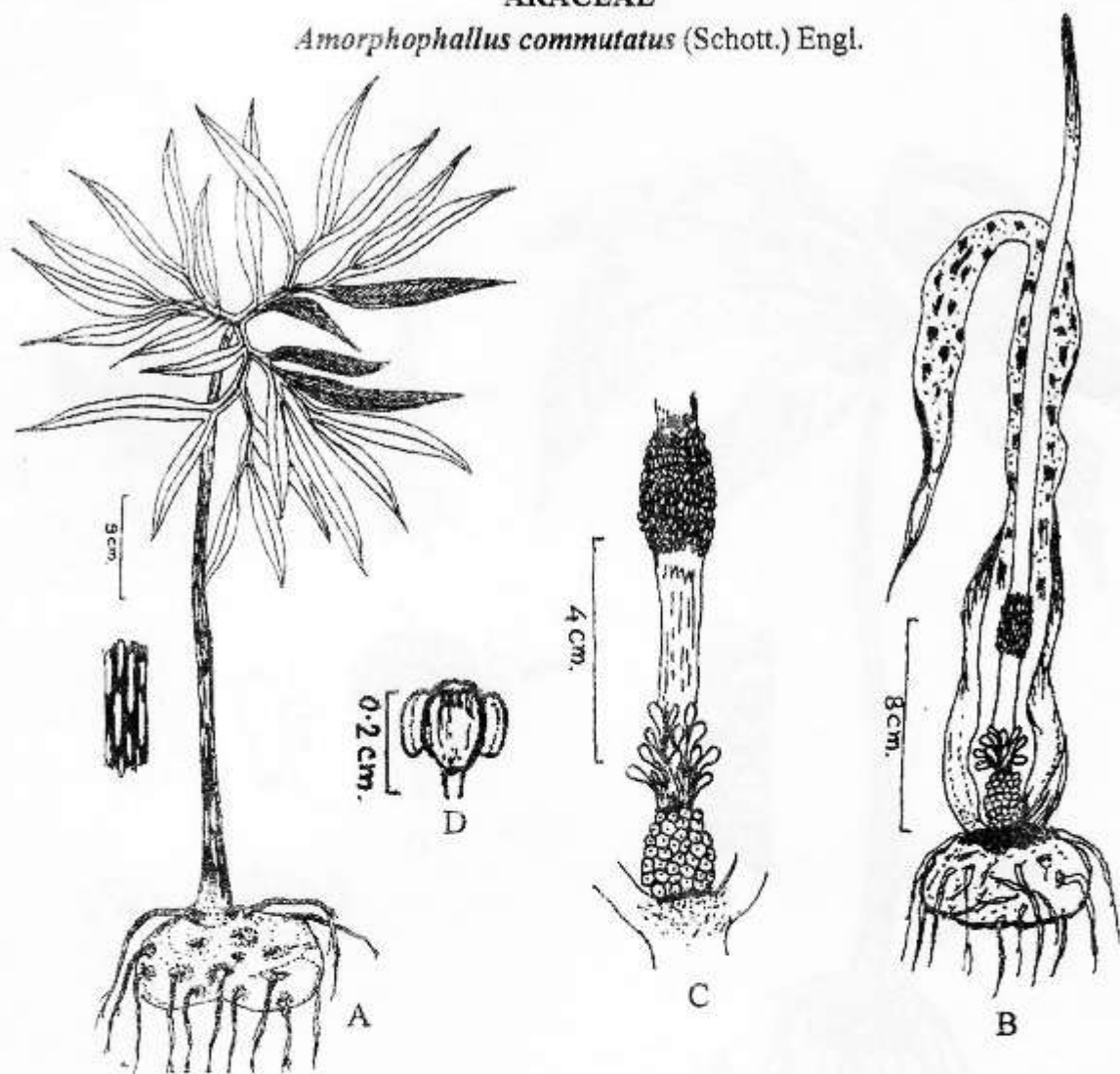
**Flrs & Frts. :-** Feb. - Apr.

**Locality :-** Most Common at Chikhaldara.

**Exsiccata :-** PYB & VDD. 234.

# ARACEAE

*Amorphophallus commutatus* (Schott.) Engl.



A - Habit sketch, B - Single flower,  
C - L.S. Flower, D - Single stamen,  
E - Gynoecium, F - T.S. Ovary, G. Stipule.

*Amorphophallus commutatus* (Schott.) Engler.  
in DC. Monog. Phan. 2 : 319. 1879 & Pflanzenr. 4,  
23c. 48 : 95. 1911; Hook. Fl. B. I. 6 : 515. 1893 : Cooke.  
Fl. Pres. Bombay. 3 : 337. 1958.

Tuberous. Leaves and inflorescences appear at different times; tuber 4 x 2 in. Leaf single; petioles 1-5 ft. stout, streaked with pale green and dark brown; leaf primarily divided into three, and each further divides dichotomously; pinnae long, narrow, 13 x 2 cm. or so. Spadix sessile intensely foul smelling; spathe nearly 9.6 - 12 inches, dark brown from outside with greenish - yellowish blotches on inner surface; margins sinuate, terminal part of the spathe curls and falls back; peduncle fleshy, almost as long as spathe; appendix long, nearly 8-10 inches; flower bearing axis 4 - 5 in. enclosed within the tube of spathe; tube somewhat dilated to the base. Female flowers pink covering about 1.5 - 2 cm. of spadix. Ovary 1 - celled, ovule solitary; stigma sessile, bilobed; immediately above the female flower is a small zone of neuters, these are stalked knob like bodies, small with sweet scent, probably serving as food bodies for pollinators. Above neuters is bare peduncle, 3.5-4 cm., pink in colour followed by a zone of male flowers for about 0.5 - 0.8 inches. Anthers subsessile, short, ditheous, connective enlarged, broad with 2 anther lobes laterally attached. In fruit stalks to the spadix develops and grows nearly upto 3 ft or so. Spathe not persisting in fruit.

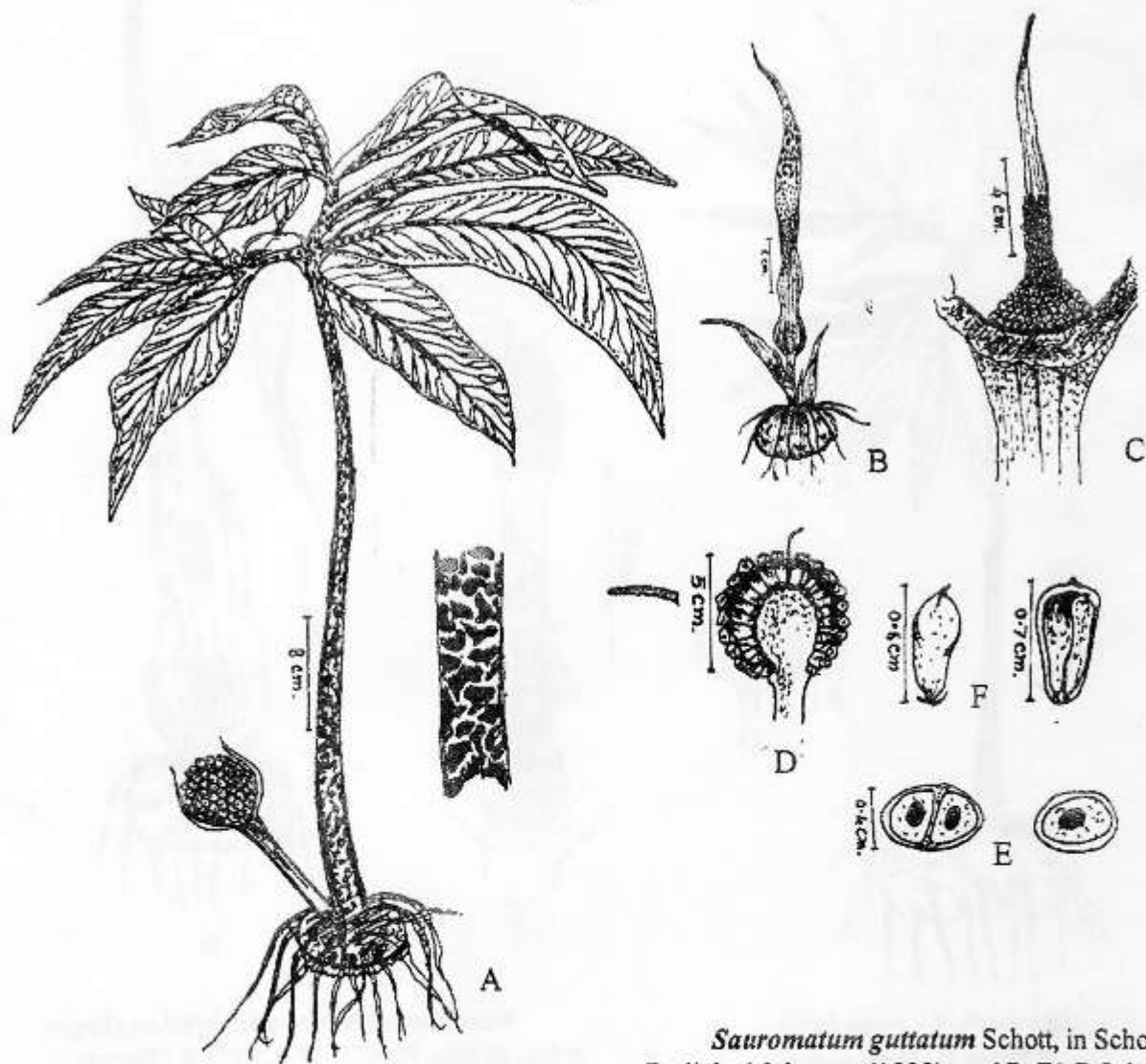
Flrs. & Frts. :- Feb. - Mar.

Locality :- Chikhaldara.

Exsiccata :- Photographs.

# ARACEAE

## *Sauromatum guttatum* Schott.



A - Habit sketch, B - Spadix, C - Spathe cut open,  
D - L.S. Fruit, E - T.S. Ovary, F - Ovary.

*Sauromatum guttatum* Schott, in Schott & Endlich. Meletem, (1832) p. 17; Fl.B.I.6:508; Engler in DC.Mong.Phan. v.2 (1879) p.570 P.428; *Sauromatum punctatum*, C. Koch, in Wochenschr. v. 1 (1858) p. 263; N.E. Brown, in Gard. Chron; (1880) part 2, p. 134, *Arum sessiliflorum*, Roxb. Fl. Ind. v. 3 (1832) p. 507; Wight, Icon. t. 800.

Tubers large. Leaf pedisect, segments 7-15, variable, 2-15 x 5 in, elliptic, acute, deep green, midrib and veins impressed above, the lower part of midrib often spotted. Petiole stout, 12 - 18 long green or spotted with reddish blotches. Spathe 8 - 15 in long; tube subglobose; limb linear - lanceolate, with dark purple spots, margin purple & wavy. Spadix much shorter than the spathe; appendix 2-3 in. long narrowed from the base to a fine point, purple. Male inflorescence 0.5 cm. long and about 1 cm. above the female. Anthers densely packed. Female inflorescence 1-1.5 cm. long. Neuters compactly arranged between male & female flowers. Fruit globose.

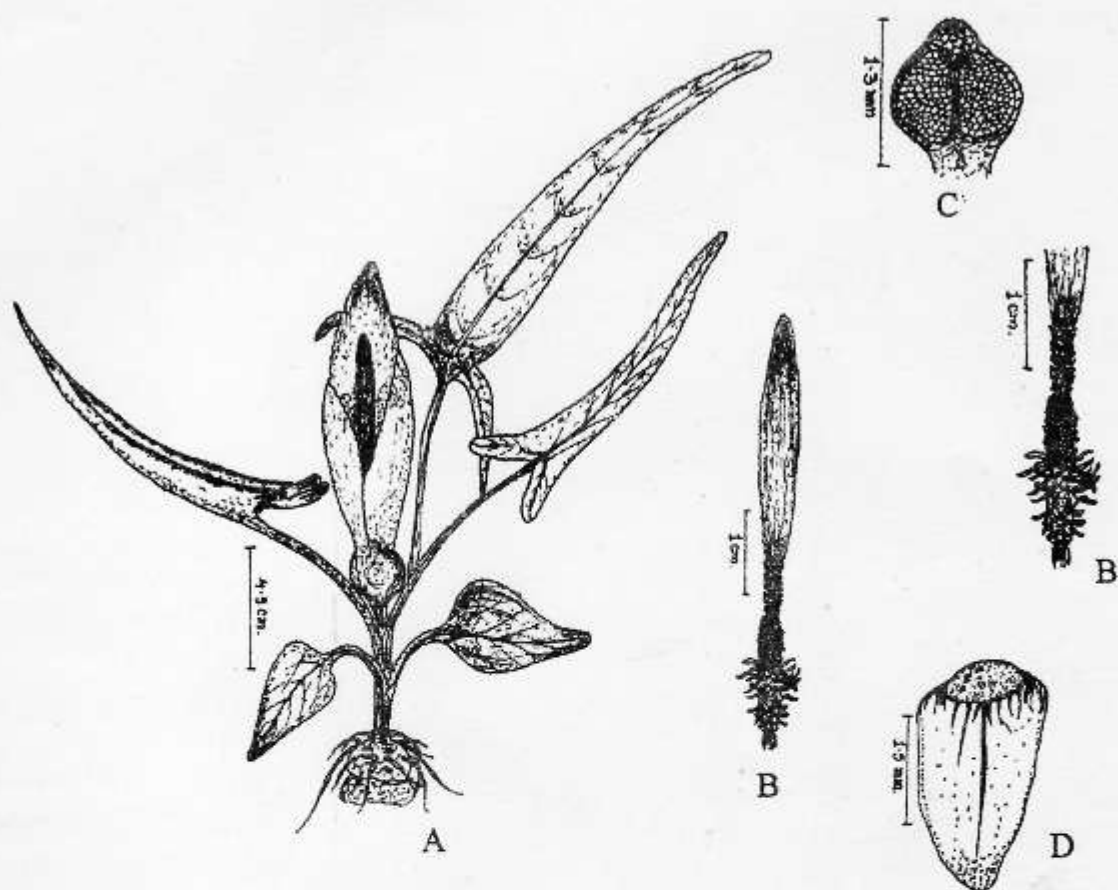
Flrs. & Frts. :- Feb. - Apr.

Locality :- Bali Round, Chikhaldara.

Exsiccata :- VDD, 289.

# ARACEAE

## *Therlophonum minutum* Willd.



A - Habit sketch, B - Spadix; spathe cut open,  
C - Anther, D - Gynoecium.

*Therlophonum minutum* Willd. Baill.,  
Hist. pl. 13: 457. 1895. *Arum minutum* Willd. Sp.  
pl. 4: 481. 1805 ext. Rheedee, Illus. cited. *T.*  
*minutum* var. *chatterjeei* Haines. Bot. Bih. Orissa  
3; 906, 1961, *T. minutum* var. *heynei* Engl. in DC.  
Monogr. Phan. 2: 607. 1879.

Plants cormose; corm spherical, old corms getting discarded. Leaves simple, petiolate, entire, obtuse, younger leaves sagittate, narrow, middle part of lamina 17 x 1 cm., lateral lobes 8 x 5 cm., petiole 7 cm. long. Inflorescence stalked. Spathe leafy, greenish, darker at the base and fades towards apex, 11-12 x 4.5 cm.; margin dentate; dark brown to purplish. Inflorescence axis 6.5 x 5.7 cm. with creamish long appendage. Male and Female flowers distant, the male with small subulate neuters above and long, narrow neuters below. The females at the base of spadix, 3-6 in number, in single series; ovaries conical, slightly notched at base, sessile, single celled, ovules pendulous and basal; stigma pulvinate discoid, with reddish brown spots. Berries not seen.

Flrs. & Frts. :- Aug. - Sept.

Locality :- Kolkaz.

Exsiccata :- PYB., VDD 279.



## **LITERATURE REFERED**

- Almeida, S.M. 1990. The Flora of Savantwadi, Maharashtra, India, Scientific Publisher Jodhpur, India.
- Cooke, T. 1903, 1958. Flora of the Presidency of Bombay. Vol. I II & III Taylor and Francies, Red Lion Court, Fleet Street, London.
- Collett, H. 1921. Flora Simlensis, Thacker, Spink & Co., London.
- Deshpande Sandhya., B.D. Sharma & M.P.Nayar, 1993. Flora of Maharashtra, Botanical Survey of India.
- Dhore, M.A. & P.A.Joshi, 1988. Flora of Melghat Tiger Reserve. Directorate, Project Tiger Melghat., Paratwada., Distt. Amravati. Maharashtra.
- Fyson P.F. 1932. The Flora of the South Indian Hill stations. Ashford stations, Madras.
- Gamble J.S. 1911. Flora of the Presidency of Madras. Vol. I & II - Kew. Britain.
- Ghurde, V.R. and D.D. Wakode 1981. A new report of Morchella from Central India. J.Mycol Pl. Pathol. II: 314-315.
- Haines, H.H. 1961. Botany of Bihar & Orissa. Vol. I. & II. Botaical Survey of India.
- Hooker. J.D. 1876-1897. The Flora of British India, Vol. I & II. London.
- Kamble, S.Y. & S.G. Pradhan. 1988. Flora of Akola Distt, Maharashtra State. Botanical Survey of India.
- Lakshminarsimhan, P. & B.D. Sharma. 1991. flora of Nashik Distt. Botanical Survey of India.
- Mathew K.M. 1981 - 1983. The Flora of Tamilnadu and Carnatic. Vol. I, II & III. Rapinath Harbarium Tiruchirapalli.
- Matthew K.M. 1981 - 1983. The Flora of Tamilnadu and Carnatic : Further Illustrations. Rapinath Herbarium Tiruchirapalli.
- Matthew K.M. 1996. Flora of Palni Hills. Illustrations. Rapinath Harbarium Tirchirapalli.
- Morthy S.K. 1992. Flora of the Taroba National park. Botanical Survey of India.
- Mudaliar S.K. 1991. *Peristylus constrictus* (Lindl.) Lindl. a new record for Maharashtra J. Econ. Tax. Bot. 15:469.
- Naik, V.N. 1979. The Flora of Osmanabad. Venus Publishers, Aurangabad, India.
- Naik, V.N. 1998. Flora of Marathwada. Vol. I & II Amrut Prakashan , station road, Aurangabad, India.
-

- Naik, V.N. and P.Y. Bhogaonkar. 1992 Taxonomic status of *Blumea jacquemontii* Hook.F. and *Laggera aurita* (L.F.) SCH. Bip Acta Botanica Indica 20: 45-49.
- Nayar M.P. & A.R.K. Shashtri. 1987, 1988. Red data Book of Indian Plants. Vol. I & II B.S.I. Calcutta.
- Patel, R.I. 1968. Forest Flora of Melghat. Prabhat Press. Meerat.
- Santapau, H. 1953. The Flora of Purandhar. Oxford Book and Stationery Co., New Delhi & Calcutta, India.
- Santapau H. 1967 (Rvd.ed.) The Flora of Khanda on the Western Ghats of India. Botanical Survey of India. Calcutta.
- Sharma B.D., S.Karthikeyan and N.P Singh. 1996. (Ed.) Flora of Maharashtra State. Monocotyledons. Botanical Survey of India, Calcutta.
- Ugemuge, N.R. 1986. flora of Nagpur District. Shree Prakashan, Nagpur.
- Wakode, D.D. 1983. Distribution of *Morchella* in time and space with special reference to Melghat Forest. Silver Jubilee Symp. Sci Cult. Technol. Edible fungi, Srinagar, 9-11 September, P-p-87 (Abstr.).
-



